

A reconstruction of  
Sang's conversion tables  
between solar  
and sidereal time  
(1868)

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TABLES  
FOR THE  
MUTUAL CONVERSION  
OF  
SOLAR AND SIDEREAL  
TIME

BY  
EDWARD SANG, F.R.S.E.

EDINBURGH  
ELECTROTYPED, PRINTED, AND PUBLISHED BY  
WILLIAM BLACKWOOD & SONS  
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(reconstruction by Denis Roegel, October 15, 2010)



## Note on the reconstruction

This book is a reconstruction of Sang's book. It was initially produced on September 3–4, 2009, and slightly improved on October 14–15, 2010. All the tables were generated automatically. The layout of the tables is very regular and the generation of the tables was therefore made straightforward.

In his preface, Sang claims that there is not a single error in his tables. We haven't checked the entire tables, but Sang's claim appears quite plausible. However, Sang's preface contains two errors, which we have left uncorrected in the following pages. The first error occurs in the third example. Sang converts 3.27 seconds of solar time into 3.26 seconds of sidereal time. But sidereal time elapses faster than solar time, and the correct value is 3.28 seconds. In the fourth example, Sang converts 2.49 seconds of sidereal time into 2.50 seconds of solar time, but for the same reasons as above, it should be 2.48 seconds. Sang's two errors cancel, so that the result of the fourth example is indeed the value he started with in the third example.

D. Roegel, 15 October 2010.



## PREFACE.

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THE operations of converting Solar into Sidereal and Sidereal into Solar Time are of very frequent occurrence in Astronomical Calculations, —so much so, that short tables for assisting in the conversion are printed in every issue of the Nautical Almanac; the values of the hours, minutes, and seconds are therein separately given, so that each conversion requires the extraction of three numbers and the addition of these together.

In the following Tables the values are given for each tenth second during the whole day, so that for all the purposes of Nautical Astronomy the equivalent time can be found by a single inspection. Even when precision to the hundredth part of a second is required, the Astronomer has only to perform mentally an addition to the last three figures of the tabulated quantity. To meet the requirements of more refined investigations, Tables of the values for each hundredth part of a second up to ten seconds are prefixed; and still farther to accomodate the Astronomer, the values are given for each Solar and for each Sidereal day during the year.

A Table of the coincidences of the beats of the Solar and Sidereal Clocks is given for the whole day; which Table will be found to have certain conveniences in the daily work of the Observatory, and particularly in the rating of chronometers.

These Tables have been constructed on the assumption that the mean equinoctial year, or interval between two consecutive mean equinoxes in March, is 365.242217 Solar or 366.242217 Sidereal days. On account of the gradual displacement of the relative positions of the equinoctial point and the earth's perihelion, these numbers, as shown

by Bessel, are subject to a small secular change; but that change is too small to affect the accuracy of the tabulated results for very many years.

The calculations were all made in duplicate by independent processes; and the precautions taken for insuring accuracy in the printing were such as to warrant the expectation that not a single error exists in the book.

The Navigator, to whom the work is especially useful, has often to make his calculations by the cabin lamp and amid the anxieties of his voyage; and therefore the Tables have not been compressed into the smallest possible shape, but have been printed in an open and easily intelligible form, and in a large and clear type. Also, as, to prevent mistakes, it is desirable to check the calculation by reconvertng the result into the first given kind of time, the Tables for converting Solar into Sidereal are placed face to face with those for turning Sidereal into Solar time; by this arrangement the reversion can be made at a glance, and without ever having to turn over more than one leaf.

## EXAMPLES.

1. To convert  $13^{\text{h}} 27^{\text{m}} 18^{\text{s}}.3768$  of mean solar time into sidereal time:—

	Sol.		Sid.
Page 180,	13 27 10	=	13 29 22.5969
Page 16,	8.37	=	8.3929
	.0068	=	68
	<hr/> 13 27 18.3768	=	<hr/> 13 29 30.9966

2. To convert  $13^{\text{h}} 29^{\text{m}} 30^{\text{s}}.9966$  of sidereal time into mean solar time:—



	Sid.		Sol.	
Page 181, 13 29 30		=	13 27 17.3828	
Page 19, .996		=	.9933	
	6	=	6	
	13 29 30.9966	=	13 27 18.3767	

3. To convert  $21^{\text{h}} 13^{\text{m}} 43^{\text{s}}.27$  of mean solar time into sidereal time:—

	Sol.		Sid.	
Page 274, 21 13 40		=	21 17 09.23	
Mentally, 3.27		=	3.26	
	21 13 43.27	=	21 17 12.49	

*N.B.* — In this and in all cases in which accuracy to the hundredth part of a second is sufficient, the addition may be performed mentally, and the result written down at once.

4. To convert  $21^{\text{h}} 17^{\text{m}} 12^{\text{s}}.49$  of sidereal time into mean solar time:—

	Sid.		Sol.	
Page 275, 21 17 10		=	21 13 40.77	
Mentally, 2.49		=	2.50	
	21 17 12.49	=	21 13 43.27	

5. The apparent sidereal time at Greenwich mean noon of Jan. I, 1868 being  $18^{\text{h}} 41^{\text{m}} 43^{\text{s}}$ , required the corresponding sidereal time for Jan. I, 1869.

	Sid.
Jan. I, 1868, apparent, . . . . .	18 41 43.00
— Equation of equinox, . . .	+.38
Mean sidereal time, . . . . .	18 41 43.38
366 solar days (p. 318) = . . . . .	0 02 59.26
Jan. I, 1869, mean sid. time, . . .	18 44 42.64
+ Equation of equinox, . . . .	−.68
Jan. I, 1869, apparent sid. time,	18 44 41.96

6. In order to test the going of a clock, the disappearance of a star against a building was observed on Feb. 2, 1866, and found to be at  $10^{\text{h}} 37^{\text{m}} 43^{\text{s}}$ . The disappearance was again observed on April 27 to be at  $5^{\text{h}} 08^{\text{m}} 17^{\text{s}}$ . Required the clock's rate.

Feb. 2, observed disappearance, ..	10	37	43
84 sid. days (p. 311), .....	18	29	44
April 27, expected disappearance,	5	07	27
Observed, .....	5	08	17
Clock's gain in 84 sidereal days,			50

the change in the position of the star being neglected.

7. In comparing a marine chronometer with the Transit Clock of the Observatory, the coincidence of the second's beat (not the halfsecond's) of the chronometer was observed at  $3^{\text{h}} 17^{\text{m}} 27^{\text{s}}$ . Required the time of the first coincidence after  $7^{\text{h}}$  on the chronometer.

Coincidence in Table, p. 322, at	3	14	47.75
Observed coincidence, .....	3	17	27.
Constant to be added, ....		2	39.25
Tabular coincidence after $7^{\text{h}}$ ,	7	00	01.71
Expected time of coincidence,	7	02	41

TIME CONVERSION  
TABLES

TABLE  
FOR  
CONVERTING  
MEAN SOLAR TIME  
INTO  
SIDEREAL TIME

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Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
0.00	0.0000	0.10	0.1003	0.20	0.2005	0.30	0.3008
.01	.0100	.11	.1103	.21	.2106	.31	.3108
.02	.0201	.12	.1203	.22	.2206	.32	.3209
.03	.0301	.13	.1304	.23	.2306	.33	.3309
.04	.0401	.14	.1404	.24	.2407	.34	.3409
0.05	0.0501	0.15	0.1504	0.25	0.2507	0.35	0.3510
.06	.0602	.16	.1604	.26	.2607	.36	.3610
.07	.0702	.17	.1705	.27	.2707	.37	.3710
.08	.0802	.18	.1805	.28	.2808	.38	.3810
.09	.0902	.19	.1905	.29	.2908	.39	.3911

TABLE  
FOR  
CONVERTING  
SIDEREAL TIME  
INTO  
MEAN SOLAR TIME

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Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
0.00	0.0000	0.10	0.0997	0.20	0.1995	0.30	0.2992
.01	.0100	.11	.1097	.21	.2094	.31	.3092
.02	.0199	.12	.1197	.22	.2194	.32	.3191
.03	.0299	.13	.1296	.23	.2294	.33	.3291
.04	.0399	.14	.1396	.24	.2393	.34	.3391
0.05	0.0499	0.15	0.1496	0.25	0.2493	0.35	0.3490
.06	.0598	.16	.1596	.26	.2593	.36	.3590
.07	.0698	.17	.1695	.27	.2693	.37	.3690
.08	.0798	.18	.1795	.28	.2792	.38	.3790
.09	.0898	.19	.1895	.29	.2892	.39	.3889

Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
0.40	0.4011	0.70	0.7019	1.00	1.0027	1.30	1.3036
.41	.4111	.71	.7119	.01	.0128	.31	.3136
.42	.4211	.72	.7220	.02	.0228	.32	.3236
.43	.4312	.73	.7320	.03	.0328	.33	.3336
.44	.4412	.74	.7420	.04	.0428	.34	.3437
0.45	0.4512	0.75	0.7521	1.05	1.0529	1.35	1.3537
.46	.4613	.76	.7621	.06	.0629	.36	.3637
.47	.4713	.77	.7721	.07	.0729	.37	.3738
.48	.4813	.78	.7821	.08	.0830	.38	.3838
.49	.4913	.79	.7922	.09	.0930	.39	.3938
0.50	0.5014	0.80	0.8022	1.10	1.1030	1.40	1.4038
.51	.5114	.81	.8122	.11	.1130	.41	.4139
.52	.5214	.82	.8222	.12	.1231	.42	.4239
.53	.5315	.83	.8323	.13	.1331	.43	.4339
.54	.5415	.84	.8423	.14	.1431	.44	.4439
0.55	0.5515	0.85	0.8523	1.15	1.1531	1.45	1.4540
.56	.5615	.86	.8624	.16	.1632	.46	.4640
.57	.5716	.87	.8724	.17	.1732	.47	.4740
.58	.5816	.88	.8824	.18	.1832	.48	.4841
.59	.5916	.89	.8924	.19	.1933	.49	.4941
0.60	0.6016	0.90	0.9025	1.20	1.2033	1.50	1.5041
.61	.6117	.91	.9125	.21	.2133	.51	.5141
.62	.6217	.92	.9225	.22	.2233	.52	.5242
.63	.6317	.93	.9325	.23	.2334	.53	.5342
.64	.6418	.94	.9426	.24	.2434	.54	.5442
0.65	0.6518	0.95	0.9526	1.25	1.2534	1.55	1.5542
.66	.6618	.96	.9626	.26	.2634	.56	.5643
.67	.6718	.97	.9727	.27	.2735	.57	.5743
.68	.6819	.98	.9827	.28	.2835	.58	.5843
.69	.6919	.99	.9927	.29	.2935	.59	.5944

Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
0.40	0.3989	0.70	0.6981	1.00	0.9973	1.30	1.2965
.41	0.4089	.71	0.7081	.01	1.0072	.31	1.3064
.42	.4189	.72	.7180	.02	.0172	.32	.3164
.43	.4288	.73	.7280	.03	.0272	.33	.3264
.44	.4388	.74	.7380	.04	.0372	.34	.3363
0.45	.4488	0.75	.7480	1.05	.0471	1.35	.3463
.46	0.4587	.76	0.7579	.06	1.0571	.36	1.3563
.47	.4687	.77	.7679	.07	.0671	.37	.3663
.48	.4787	.78	.7779	.08	.0771	.38	.3762
.49	.4887	.79	.7878	.09	.0870	.39	.3862
0.50	.4986	0.80	.7978	1.10	.0970	1.40	.3962
.51	0.5086	.81	0.8078	.11	1.1070	.41	1.4062
.52	.5186	.82	.8178	.12	.1169	.42	.4161
.53	.5286	.83	.8277	.13	.1269	.43	.4261
.54	.5385	.84	.8377	.14	.1369	.44	.4361
0.55	.5485	0.85	.8477	1.15	.1469	1.45	.4460
.56	0.5585	.86	0.8577	.16	1.1568	.46	1.4560
.57	.5684	.87	.8676	.17	.1668	.47	.4660
.58	.5784	.88	.8776	.18	.1768	.48	.4760
.59	.5884	.89	.8876	.19	.1868	.49	.4859
0.60	.5984	0.90	.8975	1.20	.1967	1.50	.4959
.61	0.6083	.91	0.9075	.21	1.2067	.51	1.5059
.62	.6183	.92	.9175	.22	.2167	.52	.5158
.63	.6283	.93	.9275	.23	.2266	.53	.5258
.64	.6383	.94	.9374	.24	.2366	.54	.5358
0.65	.6482	0.95	.9474	1.25	.2466	1.55	.5458
.66	0.6582	.96	0.9574	.26	1.2566	.56	1.5557
.67	.6682	.97	.9674	.27	.2665	.57	.5657
.68	.6781	.98	.9773	.28	.2765	.58	.5757
.69	.6881	.99	.9873	.29	.2865	.59	.5857

Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
1.60	1.6044	1.90	1.9052	2.20	2.2060	2.50	2.5068
.61	.6144	.91	.9152	.21	.2161	.51	.5169
.62	.6244	.92	.9253	.22	.2261	.52	.5269
.63	.6345	.93	.9353	.23	.2361	.53	.5369
.64	.6445	.94	.9453	.24	.2461	.54	.5470
1.65	1.6545	1.95	1.9553	2.25	2.2562	2.55	2.5570
.66	.6645	.96	.9654	.26	.2662	.56	.5670
.67	.6746	.97	.9754	.27	.2762	.57	.5770
.68	.6846	.98	.9854	.28	.2862	.58	.5871
.69	.6946	.99	.9954	.29	.2963	.59	.5971
1.70	1.7047	2.00	2.0055	2.30	2.3063	2.60	2.6071
.71	.7147	.01	.0155	.31	.3163	.61	.6171
.72	.7247	.02	.0255	.32	.3264	.62	.6272
.73	.7347	.03	.0356	.33	.3364	.63	.6372
.74	.7448	.04	.0456	.34	.3464	.64	.6472
1.75	1.7548	2.05	2.0556	2.35	2.3564	2.65	2.6573
.76	.7648	.06	.0656	.36	.3665	.66	.6673
.77	.7748	.07	.0757	.37	.3765	.67	.6773
.78	.7849	.08	.0857	.38	.3865	.68	.6873
.79	.7949	.09	.0957	.39	.3965	.69	.6974
1.80	1.8049	2.10	2.1057	2.40	2.4066	2.70	2.7074
.81	.8150	.11	.1158	.41	.4166	.71	.7174
.82	.8250	.12	.1258	.42	.4266	.72	.7274
.83	.8350	.13	.1358	.43	.4367	.73	.7375
.84	.8450	.14	.1459	.44	.4467	.74	.7475
1.85	1.8551	2.15	2.1559	2.45	2.4567	2.75	2.7575
.86	.8651	.16	.1659	.46	.4667	.76	.7676
.87	.8751	.17	.1759	.47	.4768	.77	.7776
.88	.8851	.18	.1860	.48	.4868	.78	.7876
.89	.8952	.19	.1960	.49	.4968	.79	.7976



Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
1.60	1.5956	1.90	1.8948	2.20	2.1940	2.50	2.4932
.61	1.6056	.91	1.9048	.21	2.2040	.51	2.5031
.62	.6156	.92	.9148	.22	.2139	.52	.5131
.63	.6255	.93	.9247	.23	.2239	.53	.5231
.64	.6355	.94	.9347	.24	.2339	.54	.5331
1.65	.6455	1.95	.9447	2.25	.2439	2.55	.5430
.66	1.6555	.96	1.9546	.26	2.2538	.56	2.5530
.67	.6654	.97	.9646	.27	.2638	.57	.5630
.68	.6754	.98	.9746	.28	.2738	.58	.5730
.69	.6854	.99	.9846	.29	.2837	.59	.5829
1.70	.6954	2.00	.9945	2.30	.2937	2.60	.5929
.71	1.7053	.01	2.0045	.31	2.3037	.61	2.6029
.72	.7153	.02	.0145	.32	.3137	.62	.6128
.73	.7253	.03	.0245	.33	.3236	.63	.6228
.74	.7352	.04	.0344	.34	.3336	.64	.6328
1.75	.7452	2.05	.0444	2.35	.3436	2.65	.6428
.76	1.7552	.06	2.0544	.36	2.3536	.66	2.6527
.77	.7652	.07	.0643	.37	.3635	.67	.6627
.78	.7751	.08	.0743	.38	.3735	.68	.6727
.79	.7851	.09	.0843	.39	.3835	.69	.6827
1.80	.7951	2.10	.0943	2.40	.3934	2.70	.6926
.81	1.8051	.11	2.1042	.41	2.4034	.71	2.7026
.82	.8150	.12	.1142	.42	.4134	.72	.7126
.83	.8250	.13	.1242	.43	.4234	.73	.7225
.84	.8350	.14	.1342	.44	.4333	.74	.7325
1.85	.8449	2.15	.1441	2.45	.4433	2.75	.7425
.86	1.8549	.16	2.1541	.46	2.4533	.76	2.7525
.87	.8649	.17	.1641	.47	.4633	.77	.7624
.88	.8749	.18	.1740	.48	.4732	.78	.7724
.89	.8848	.19	.1840	.49	.4832	.79	.7824

Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
2.80	2.8077	3.10	3.1085	3.40	3.4093	3.70	3.7101
.81	.8177	.11	.1185	.41	.4193	.71	.7202
.82	.8277	.12	.1285	.42	.4294	.72	.7302
.83	.8377	.13	.1386	.43	.4394	.73	.7402
.84	.8478	.14	.1486	.44	.4494	.74	3.7502
2.85	2.8578	3.15	3.1586	3.45	3.4594	3.75	.7603
.86	.8678	.16	.1687	.46	.4695	.76	.7703
.87	.8779	.17	.1787	.47	.4795	.77	.7803
.88	.8879	.18	.1887	.48	.4895	.78	.7903
.89	.8979	.19	.1987	.49	.4996	.79	3.8004
2.90	2.9079	3.20	3.2088	3.50	3.5096	3.80	.8104
.91	.9180	.21	.2188	.51	.5196	.81	.8204
.92	.9280	.22	.2288	.52	.5296	.82	.8305
.93	.9380	.23	.2388	.53	.5397	.83	.8405
.94	.9480	.24	.2489	.54	.5497	.84	3.8505
2.95	2.9581	3.25	3.2589	3.55	3.5597	3.85	.8605
.96	.9681	.26	.2689	.56	.5697	.86	.8706
.97	.9781	.27	.2790	.57	.5798	.87	.8806
.98	.9882	.28	.2890	.58	.5898	.88	.8906
.99	.9982	.29	.2990	.59	.5998	.89	3.9007
3.00	3.0082	3.30	3.3090	3.60	3.6099	3.90	.9107
.01	.0182	.31	.3191	.61	.6199	.91	.9207
.02	.0283	.32	.3291	.62	.6299	.92	.9307
.03	.0383	.33	.3391	.63	.6399	.93	.9408
.04	.0483	.34	.3491	.64	3.6500	.94	3.9508
3.05	3.0584	3.35	3.3592	3.65	.6600	3.95	.9608
.06	.0684	.36	.3692	.66	.6700	.96	.9708
.07	.0784	.37	.3792	.67	.6800	.97	.9809
.08	.0884	.38	.3893	.68	.6901	.98	.9909
.09	.0985	.39	.3993	.69	3.7001	.99	4.0009

Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
2.80	2.7924	3.10	3.0915	3.40	3.3907	3.70	3.6899
.81	2.8023	.11	3.1015	.41	3.4007	.71	.6999
.82	.8123	.12	.1115	.42	.4107	.72	3.7098
.83	.8223	.13	.1215	.43	.4206	.73	.7198
.84	.8322	.14	.1314	.44	.4306	.74	.7298
2.85	.8422	3.15	.1414	3.45	.4406	3.75	.7398
.86	2.8522	.16	3.1514	.46	3.4506	.76	.7497
.87	.8622	.17	.1613	.47	.4605	.77	3.7597
.88	.8721	.18	.1713	.48	.4705	.78	.7697
.89	.8821	.19	.1813	.49	.4805	.79	.7797
2.90	.8921	3.20	.1913	3.50	.4904	3.80	.7896
.91	2.9021	.21	3.2012	.51	3.5004	.81	.7996
.92	.9120	.22	.2112	.52	.5104	.82	3.8096
.93	.9220	.23	.2212	.53	.5204	.83	.8195
.94	.9320	.24	.2312	.54	.5303	.84	.8295
2.95	.9419	3.25	.2411	3.55	.5403	3.85	.8395
.96	2.9519	.26	3.2511	.56	3.5503	.86	.8495
.97	.9619	.27	.2611	.57	.5603	.87	3.8594
.98	.9719	.28	.2710	.58	.5702	.88	.8694
.99	.9818	.29	.2810	.59	.5802	.89	.8794
3.00	.9918	3.30	.2910	3.60	.5902	3.90	.8894
.01	3.0018	.31	3.3010	.61	3.6001	.91	.8993
.02	.0118	.32	.3109	.62	.6101	.92	3.9093
.03	.0217	.33	.3209	.63	.6201	.93	.9193
.04	.0317	.34	.3309	.64	.6301	.94	.9292
3.05	.0417	3.35	.3409	3.65	.6400	3.95	.9392
.06	3.0516	.36	3.3508	.66	3.6500	.96	.9492
.07	.0616	.37	.3608	.67	.6600	.97	3.9592
.08	.0716	.38	.3708	.68	.6700	.98	.9691
.09	.0816	.39	.3807	.69	.6799	.99	.9791

Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
4.00	4.0110	4.30	4.3118	4.60	4.6126	4.90	4.9134
.01	.0210	.31	.3218	.61	.6226	.91	.9234
.02	.0310	.32	.3318	.62	.6326	.92	.9335
.03	.0410	.33	.3419	.63	.6427	.93	.9435
.04	4.0511	.34	4.3519	.64	4.6527	.94	4.9535
4.05	.0611	4.35	.3619	4.65	.6627	4.95	.9636
.06	.0711	.36	.3719	.66	.6728	.96	.9736
.07	.0811	.37	.3820	.67	.6828	.97	.9836
.08	.0912	.38	.3920	.68	.6928	.98	.9936
.09	4.1012	.39	4.4020	.69	4.7028	.99	5.0037
4.10	.1112	4.40	.4120	4.70	.7129	5.00	.0137
.11	.1213	.41	.4221	.71	.7229	.01	.0237
.12	.1313	.42	.4321	.72	.7329	.02	.0337
.13	.1413	.43	.4421	.73	.7430	.03	.0438
.14	4.1513	.44	4.4522	.74	4.7530	.04	5.0538
4.15	.1614	4.45	.4622	4.75	.7630	5.05	.0638
.16	.1714	.46	.4722	.76	.7730	.06	.0739
.17	.1814	.47	.4822	.77	.7831	.07	.0839
.18	.1914	.48	.4923	.78	.7931	.08	.0939
.19	4.2015	.49	4.5023	.79	4.8031	.09	5.1039
4.20	.2115	4.50	.5123	4.80	.8131	5.10	.1140
.21	.2215	.51	.5223	.81	.8232	.11	.1240
.22	.2316	.52	.5324	.82	.8332	.12	.1340
.23	.2416	.53	.5424	.83	.8432	.13	.1440
.24	4.2516	.54	4.5524	.84	4.8533	.14	5.1541
4.25	.2616	4.55	.5625	4.85	.8633	5.15	.1641
.26	.2717	.56	.5725	.86	.8733	.16	.1741
.27	.2817	.57	.5825	.87	.8833	.17	.1842
.28	.2917	.58	.5925	.88	.8934	.18	.1942
.29	4.3017	.59	4.6026	.89	4.9034	.19	5.2042

Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
4.00	3.9891	4.30	4.2883	4.60	4.5874	4.90	4.8866
.01	.9991	.31	.2982	.61	.5974	.91	.8966
.02	4.0090	.32	4.3082	.62	4.6074	.92	4.9066
.03	.0190	.33	.3182	.63	.6174	.93	.9165
.04	.0290	.34	.3281	.64	.6273	.94	.9265
4.05	.0389	4.35	.3381	4.65	.6373	4.95	.9365
.06	.0489	.36	.3481	.66	.6473	.96	.9465
.07	4.0589	.37	4.3581	.67	4.6572	.97	4.9564
.08	.0689	.38	.3680	.68	.6672	.98	.9664
.09	.0788	.39	.3780	.69	.6772	.99	.9764
4.10	.0888	4.40	.3880	4.70	.6872	5.00	.9863
.11	.0988	.41	.3980	.71	.6971	.01	.9963
.12	4.1088	.42	4.4079	.72	4.7071	.02	5.0063
.13	.1187	.43	.4179	.73	.7171	.03	.0163
.14	.1287	.44	.4279	.74	.7271	.04	.0262
4.15	.1387	4.45	.4378	4.75	.7370	5.05	.0362
.16	.1486	.46	.4478	.76	.7470	.06	.0462
.17	4.1586	.47	4.4578	.77	4.7570	.07	5.0562
.18	.1686	.48	.4678	.78	.7669	.08	.0661
.19	.1786	.49	.4777	.79	.7769	.09	.0761
4.20	.1885	4.50	.4877	4.80	.7869	5.10	.0861
.21	.1985	.51	.4977	.81	.7969	.11	.0960
.22	4.2085	.52	4.5077	.82	4.8068	.12	5.1060
.23	.2185	.53	.5176	.83	.8168	.13	.1160
.24	.2284	.54	.5276	.84	.8268	.14	.1260
4.25	.2384	4.55	.5376	4.85	.8368	5.15	.1359
.26	.2484	.56	.5475	.86	.8467	.16	.1459
.27	4.2583	.57	4.5575	.87	4.8567	.17	5.1559
.28	.2683	.58	.5675	.88	.8667	.18	.1659
.29	.2783	.59	.5775	.89	.8766	.19	.1758

Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
5.20	5.2142	5.50	5.5151	5.80	5.8159	6.10	6.1167
.21	.2243	.51	.5251	.81	.8259	.11	.1267
.22	.2343	.52	.5351	.82	.8359	.12	.1368
.23	.2443	.53	.5451	.83	.8460	.13	.1468
.24	5.2543	.54	5.5552	.84	5.8560	.14	6.1568
5.25	.2644	5.55	.5652	5.85	.8660	6.15	.1668
.26	.2744	.56	.5752	.86	.8760	.16	.1769
.27	.2844	.57	.5853	.87	.8861	.17	.1869
.28	.2945	.58	.5953	.88	.8961	.18	.1969
.29	5.3045	.59	5.6053	.89	5.9061	.19	6.2069
5.30	.3145	5.60	.6153	5.90	.9162	6.20	.2170
.31	.3245	.61	.6254	.91	.9262	.21	.2270
.32	.3346	.62	.6354	.92	.9362	.22	.2370
.33	.3446	.63	.6454	.93	.9462	.23	.2471
.34	5.3546	.64	5.6554	.94	5.9563	.24	6.2571
5.35	.3646	5.65	.6655	5.95	.9663	6.25	.2671
.36	.3747	.66	.6755	.96	.9763	.26	.2771
.37	.3847	.67	.6855	.97	.9863	.27	.2872
.38	.3947	.68	.6956	.98	.9964	.28	.2972
.39	5.4048	.69	5.7056	.99	6.0064	.29	6.3072
5.40	.4148	5.70	.7156	6.00	.0164	6.30	.3172
.41	.4248	.71	.7256	.01	.0265	.31	.3273
.42	.4348	.72	.7357	.02	.0365	.32	.3373
.43	.4449	.73	.7457	.03	.0465	.33	.3473
.44	5.4549	.74	5.7557	.04	6.0565	.34	6.3574
5.45	.4649	5.75	.7657	6.05	.0666	6.35	.3674
.46	.4749	.76	.7758	.06	.0766	.36	.3774
.47	.4850	.77	.7858	.07	.0866	.37	.3874
.48	.4950	.78	.7958	.08	.0966	.38	.3975
.49	5.5050	.79	5.8059	.09	6.1067	.39	6.4075

Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
5.20	5.1858	5.50	5.4850	5.80	5.7842	6.10	6.0833
.21	.1958	.51	.4950	.81	.7941	.11	.0933
.22	5.2057	.52	5.5049	.82	5.8041	.12	6.1033
.23	.2157	.53	.5149	.83	.8141	.13	.1133
.24	.2257	.54	.5249	.84	.8241	.14	.1232
5.25	.2357	5.55	.5348	5.85	.8340	6.15	.1332
.26	.2456	.56	.5448	.86	.8440	.16	.1432
.27	5.2556	.57	5.5548	.87	5.8540	.17	6.1532
.28	.2656	.58	.5648	.88	.8639	.18	.1631
.29	.2756	.59	.5747	.89	.8739	.19	.1731
5.30	.2855	5.60	.5847	5.90	.8839	6.20	.1831
.31	.2955	.61	.5947	.91	.8939	.21	.1930
.32	5.3055	.62	5.6047	.92	5.9038	.22	6.2030
.33	.3154	.63	.6146	.93	.9138	.23	.2130
.34	.3254	.64	.6246	.94	.9238	.24	.2230
5.35	.3354	5.65	.6346	5.95	.9338	6.25	.2329
.36	.3454	.66	.6445	.96	.9437	.26	.2429
.37	5.3553	.67	5.6545	.97	5.9537	.27	6.2529
.38	.3653	.68	.6645	.98	.9637	.28	.2629
.39	.3753	.69	.6745	.99	.9736	.29	.2728
5.40	.3853	5.70	.6844	6.00	.9836	6.30	.2828
.41	.3952	.71	.6944	.01	.9936	.31	.2928
.42	5.4052	.72	5.7044	.02	6.0036	.32	6.3027
.43	.4152	.73	.7144	.03	.0135	.33	.3127
.44	.4251	.74	.7243	.04	.0235	.34	.3227
5.45	.4351	5.75	.7343	6.05	.0335	6.35	.3327
.46	.4451	.76	.7443	.06	.0435	.36	.3426
.47	5.4551	.77	5.7542	.07	6.0534	.37	6.3526
.48	.4650	.78	.7642	.08	.0634	.38	.3626
.49	.4750	.79	.7742	.09	.0734	.39	.3726

Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
6.40	6.4175	6.70	6.7183	7.00	7.0192	7.30	7.3200
.41	.4275	.71	.7284	.01	.0292	.31	.3300
.42	.4376	.72	.7384	.02	.0392	.32	.3400
.43	.4476	.73	.7484	.03	.0492	.33	7.3501
.44	6.4576	.74	6.7585	.04	7.0593	.34	.3601
6.45	.4677	6.75	.7685	7.05	.0693	7.35	.3701
.46	.4777	.76	.7785	.06	.0793	.36	.3802
.47	.4877	.77	.7885	.07	.0894	.37	.3902
.48	.4977	.78	.7986	.08	.0994	.38	7.4002
.49	6.5078	.79	6.8086	.09	7.1094	.39	.4102
6.50	.5178	6.80	.8186	7.10	.1194	7.40	.4203
.51	.5278	.81	.8286	.11	.1295	.41	.4303
.52	.5379	.82	.8387	.12	.1395	.42	.4403
.53	.5479	.83	.8487	.13	.1495	.43	7.4503
.54	6.5579	.84	6.8587	.14	7.1595	.44	.4604
6.55	.5679	6.85	.8688	7.15	.1696	7.45	.4704
.56	.5780	.86	.8788	.16	.1796	.46	.4804
.57	.5880	.87	.8888	.17	.1896	.47	.4905
.58	.5980	.88	.8988	.18	.1997	.48	7.5005
.59	6.6080	.89	6.9089	.19	7.2097	.49	.5105
6.60	.6181	6.90	.9189	7.20	.2197	7.50	.5205
.61	.6281	.91	.9289	.21	.2297	.51	.5306
.62	.6381	.92	.9389	.22	.2398	.52	.5406
.63	.6482	.93	.9490	.23	.2498	.53	7.5506
.64	6.6582	.94	6.9590	.24	7.2598	.54	.5606
6.65	.6682	6.95	.9690	7.25	.2698	7.55	.5707
.66	.6782	.96	.9791	.26	.2799	.56	.5807
.67	.6883	.97	.9891	.27	.2899	.57	.5907
.68	.6983	.98	.9991	.28	.2999	.58	7.6008
.69	6.7083	.99	7.0091	.29	.3100	.59	.6108



Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
6.40	6.3825	6.70	6.6817	7.00	6.9809	7.30	7.2801
.41	.3925	.71	.6917	.01	.9909	.31	.2900
.42	6.4025	.72	6.7017	.02	7.0008	.32	7.3000
.43	.4124	.73	.7116	.03	.0108	.33	.3100
.44	.4224	.74	.7216	.04	.0208	.34	.3200
6.45	.4324	6.75	.7316	7.05	.0308	7.35	.3299
.46	.4424	.76	.7415	.06	.0407	.36	.3399
.47	6.4523	.77	6.7515	.07	7.0507	.37	.3499
.48	.4623	.78	.7615	.08	.0607	.38	7.3598
.49	.4723	.79	.7715	.09	.0706	.39	.3698
6.50	.4823	6.80	.7814	7.10	.0806	7.40	.3798
.51	.4922	.81	.7914	.11	.0906	.41	.3898
.52	6.5022	.82	6.8014	.12	7.1006	.42	.3997
.53	.5122	.83	.8114	.13	.1105	.43	7.4097
.54	.5221	.84	.8213	.14	.1205	.44	.4197
6.55	.5321	6.85	.8313	7.15	.1305	7.45	.4297
.56	.5421	.86	.8413	.16	.1405	.46	.4396
.57	6.5521	.87	6.8512	.17	7.1504	.47	.4496
.58	.5620	.88	.8612	.18	.1604	.48	7.4596
.59	.5720	.89	.8712	.19	.1704	.49	.4695
6.60	.5820	6.90	.8812	7.20	.1803	7.50	.4795
.61	.5920	.91	.8911	.21	.1903	.51	.4895
.62	6.6019	.92	6.9011	.22	7.2003	.52	.4995
.63	.6119	.93	.9111	.23	.2103	.53	7.5094
.64	.6219	.94	.9211	.24	.2202	.54	.5194
6.65	.6318	6.95	.9310	7.25	.2302	7.55	.5294
.66	.6418	.96	.9410	.26	.2402	.56	.5394
.67	6.6518	.97	6.9510	.27	7.2501	.57	.5493
.68	.6618	.98	.9609	.28	.2601	.58	7.5593
.69	.6717	.99	.9709	.29	.2701	.59	.5693

Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
7.60	7.6208	7.90	7.9216	8.20	8.2225	8.50	8.5233
.61	.6308	.91	.9317	.21	.2325	.51	.5333
.62	.6409	.92	.9417	.22	.2425	.52	.5433
.63	7.6509	.93	7.9517	.23	8.2525	.53	8.5534
.64	.6609	.94	.9617	.24	.2626	.54	.5634
7.65	.6709	7.95	.9718	8.25	.2726	8.55	.5734
.66	.6810	.96	.9818	.26	.2826	.56	.5834
.67	.6910	.97	.9918	.27	.2926	.57	.5935
.68	7.7010	.98	8.0018	.28	8.3027	.58	8.6035
.69	.7111	.99	.0119	.29	.3127	.59	.6135
7.70	.7211	8.00	.0219	8.30	.3227	8.60	.6235
.71	.7311	.01	.0319	.31	.3328	.61	.6336
.72	.7411	.02	.0420	.32	.3428	.62	.6436
.73	7.7512	.03	8.0520	.33	8.3528	.63	8.6536
.74	.7612	.04	.0620	.34	.3628	.64	.6637
7.75	.7712	8.05	.0720	8.35	.3729	8.65	.6737
.76	.7812	.06	.0821	.36	.3829	.66	.6837
.77	.7913	.07	.0921	.37	.3929	.67	.6937
.78	7.8013	.08	8.1021	.38	8.4029	.68	8.7038
.79	.8113	.09	.1121	.39	.4130	.69	.7138
7.80	.8214	8.10	.1222	8.40	.4230	8.70	.7238
.81	.8314	.11	.1322	.41	.4330	.71	.7338
.82	.8414	.12	.1422	.42	.4431	.72	.7439
.83	7.8514	.13	8.1523	.43	8.4531	.73	8.7539
.84	.8615	.14	.1623	.44	.4631	.74	.7639
7.85	.8715	8.15	.1723	8.45	.4731	8.75	.7740
.86	.8815	.16	.1823	.46	.4832	.76	.7840
.87	.8915	.17	.1924	.47	.4932	.77	.7940
.88	7.9016	.18	8.2024	.48	8.5032	.78	8.8040
.89	.9116	.19	.2124	.49	.5132	.79	.8141

Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
7.60	7.5792	7.90	7.8784	8.20	8.1776	8.50	8.4768
.61	.5892	.91	.8884	.21	.1876	.51	.4868
.62	.5992	.92	.8984	.22	.1976	.52	.4967
.63	7.6092	.93	7.9083	.23	8.2075	.53	8.5067
.64	.6191	.94	.9183	.24	.2175	.54	.5167
7.65	.6291	7.95	.9283	8.25	.2275	8.55	.5267
.66	.6391	.96	.9383	.26	.2374	.56	.5366
.67	.6491	.97	.9482	.27	.2474	.57	.5466
.68	7.6590	.98	7.9582	.28	8.2574	.58	8.5566
.69	.6690	.99	.9682	.29	.2674	.59	.5665
7.70	.6790	8.00	.9782	8.30	.2773	8.60	.5765
.71	.6889	.01	.9881	.31	.2873	.61	.5865
.72	.6989	.02	.9981	.32	.2973	.62	.5965
.73	7.7089	.03	8.0081	.33	8.3073	.63	8.6064
.74	.7189	.04	.0180	.34	.3172	.64	.6164
7.75	.7288	8.05	.0280	8.35	.3272	8.65	.6264
.76	.7388	.06	.0380	.36	.3372	.66	.6364
.77	.7488	.07	.0480	.37	.3471	.67	.6463
.78	7.7588	.08	8.0579	.38	8.3571	.68	8.6563
.79	.7687	.09	.0679	.39	.3671	.69	.6663
7.80	.7787	8.10	.0779	8.40	.3771	8.70	.6762
.81	.7887	.11	.0879	.41	.3870	.71	.6862
.82	.7986	.12	.0978	.42	.3970	.72	.6962
.83	7.8086	.13	8.1078	.43	8.4070	.73	8.7062
.84	.8186	.14	.1178	.44	.4170	.74	.7161
7.85	.8286	8.15	.1277	8.45	.4269	8.75	.7261
.86	.8385	.16	.1377	.46	.4369	.76	.7361
.87	.8485	.17	.1477	.47	.4469	.77	.7461
.88	7.8585	.18	8.1577	.48	8.4568	.78	8.7560
.89	.8685	.19	.1676	.49	.4668	.79	.7660

Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.
8.80	8.8241	9.10	9.1249	9.40	9.4257	9.70	9.7266
.81	.8341	.11	.1349	.41	.4358	.71	.7366
.82	.8441	.12	.1450	.42	.4458	.72	.7466
.83	8.8542	.13	9.1550	.43	9.4558	.73	9.7566
.84	.8642	.14	.1650	.44	.4658	.74	.7667
8.85	.8742	9.15	.1751	9.45	.4759	9.75	.7767
.86	.8843	.16	.1851	.46	.4859	.76	.7867
.87	.8943	.17	.1951	.47	.4959	.77	.7967
.88	8.9043	.18	9.2051	.48	9.5060	.78	9.8068
.89	.9143	.19	.2152	.49	.5160	.79	.8168
8.90	.9244	9.20	.2252	9.50	.5260	9.80	.8268
.91	.9344	.21	.2352	.51	.5360	.81	.8369
.92	.9444	.22	.2452	.52	.5461	.82	.8469
.93	8.9544	.23	9.2553	.53	9.5561	.83	9.8569
.94	.9645	.24	.2653	.54	.5661	.84	.8669
8.95	.9745	9.25	.2753	9.55	.5761	9.85	.8770
.96	.9845	.26	.2854	.56	.5862	.86	.8870
.97	.9946	.27	.2954	.57	.5962	.87	.8970
.98	9.0046	.28	9.3054	.58	9.6062	.88	9.9071
.99	.0146	.29	.3154	.59	.6163	.89	.9171
9.00	.0246	9.30	.3255	9.60	.6263	9.90	.9271
.01	.0347	.31	.3355	.61	.6363	.91	.9371
.02	.0447	.32	.3455	.62	.6463	.92	.9472
.03	9.0547	.33	9.3555	.63	9.6564	.93	9.9572
.04	.0648	.34	.3656	.64	.6664	.94	.9672
9.05	.0748	9.35	.3756	9.65	.6764	9.95	.9772
.06	.0848	.36	.3856	.66	.6864	.96	.9873
.07	.0948	.37	.3957	.67	.6965	.97	.9973
.08	9.1049	.38	9.4057	.68	9.7065	.98	◆.0073
.09	.1149	.39	.4157	.69	.7165	.99	.0174

Sid.	Sol.	Sid.	Sol.	Sid.	Sol.	Sid.	Sol.
8.80	8.7760	9.10	9.0752	9.40	9.3743	9.70	9.6735
.81	.7859	.11	.0851	.41	.3843	.71	.6835
.82	.7959	.12	.0951	.42	.3943	.72	.6935
.83	8.8059	.13	9.1051	.43	9.4043	.73	9.7034
.84	.8159	.14	.1150	.44	.4142	.74	.7134
8.85	.8258	9.15	.1250	9.45	.4242	9.75	.7234
.86	.8358	.16	.1350	.46	.4342	.76	.7334
.87	.8458	.17	.1450	.47	.4441	.77	.7433
.88	8.8558	.18	9.1549	.48	9.4541	.78	9.7533
.89	.8657	.19	.1649	.49	.4641	.79	.7633
8.90	.8757	9.20	.1749	9.50	.4741	9.80	.7732
.91	.8857	.21	.1849	.51	.4840	.81	.7832
.92	.8956	.22	.1948	.52	.4940	.82	.7932
.93	8.9056	.23	9.2048	.53	9.5040	.83	9.8032
.94	.9156	.24	.2148	.54	.5140	.84	.8131
8.95	.9256	9.25	.2247	9.55	.5239	9.85	.8231
.96	.9355	.26	.2347	.56	.5339	.86	.8331
.97	.9455	.27	.2447	.57	.5439	.87	.8431
.98	8.9555	.28	9.2547	.58	9.5538	.88	9.8530
.99	.9655	.29	.2646	.59	.5638	.89	.8630
9.00	.9754	9.30	.2746	9.60	.5738	9.90	.8730
.01	.9854	.31	.2846	.61	.5838	.91	.8829
.02	.9954	.32	.2946	.62	.5937	.92	.8929
.03	9.0053	.33	9.3045	.63	9.6037	.93	9.9029
.04	.0153	.34	.3145	.64	.6137	.94	.9129
9.05	.0253	9.35	.3245	9.65	.6237	9.95	.9228
.06	.0353	.36	.3344	.66	.6336	.96	.9328
.07	.0452	.37	.3444	.67	.6436	.97	.9428
.08	9.0552	.38	9.3544	.68	9.6536	.98	9.9528
.09	.0652	.39	.3644	.69	.6635	.99	.9627

Solar.	Sidereal.	Solar.	Sidereal.
0 00 00	0 00 00.0000	0 05 00	0 05 00.8214
10	10.0274	10	10.8488
20	20.0548	20	20.8761
30	30.0821	30	30.9035
40	40.1095	40	40.9309
50	50.1369	50	50.9583
0 01 00	0 01 00.1643	0 06 00	0 06 00.9856
10	10.1917	10	11.0130
20	20.2190	20	21.0404
30	30.2464	30	31.0678
40	40.2738	40	41.0952
50	50.3012	50	51.1225
0 02 00	0 02 00.3285	0 07 00	0 07 01.1499
10	10.3559	10	11.1773
20	20.3833	20	21.2047
30	30.4107	30	31.2321
40	40.4381	40	41.2594
50	50.4654	50	51.2868
0 03 00	0 03 00.4928	0 08 00	0 08 01.3142
10	10.5202	10	11.3416
20	20.5476	20	21.3690
30	30.5750	30	31.3963
40	40.6023	40	41.4237
50	50.6297	50	51.4511
0 04 00	0 04 00.6571	0 09 00	0 09 01.4785
10	10.6845	10	11.5059
20	20.7119	20	21.5332
30	30.7392	30	31.5606
40	40.7666	40	41.5880
50	50.7940	50	51.6154

Sidereal.	Solar.	Sidereal.	Solar.
0 00 00	0 00 00.0000	0 05 00	0 04 59.1809
10	09.9727	10	0 05 09.1536
20	19.9454	20	19.1263
30	29.9181	30	29.0990
40	39.8908	40	39.0717
50	49.8635	50	49.0443
0 01 00	59.8362	0 06 00	59.0170
10	0 01 09.8089	10	0 06 08.9897
20	19.7816	20	18.9624
30	29.7543	30	28.9351
40	39.7270	40	38.9078
50	49.6997	50	48.8805
0 02 00	59.6723	0 07 00	58.8532
10	0 02 09.6450	10	0 07 08.8259
20	19.6177	20	18.7986
30	29.5904	30	28.7713
40	39.5631	40	38.7440
50	49.5358	50	48.7167
0 03 00	59.5085	0 08 00	58.6894
10	0 03 09.4812	10	0 08 08.6621
20	19.4539	20	18.6348
30	29.4266	30	28.6075
40	39.3993	40	38.5802
50	49.3720	50	48.5529
0 04 00	59.3447	0 09 00	58.5256
10	0 04 09.3174	10	0 09 08.4983
20	19.2901	20	18.4710
30	29.2628	30	28.4437
40	39.2355	40	38.4163
50	49.2082	50	48.3890

Solar.	Sidereal.	Solar.	Sidereal.
0 10 00	0 10 01.6427	0 15 00	0 15 02.4641
10	11.6701	10	12.4915
20	21.6975	20	22.5189
30	31.7249	30	32.5463
40	41.7523	40	42.5736
50	51.7796	50	52.6010
0 11 00	0 11 01.8070	0 16 00	0 16 02.6284
10	11.8344	10	12.6558
20	21.8618	20	22.6832
30	31.8892	30	32.7105
40	41.9165	40	42.7379
50	51.9439	50	52.7653
0 12 00	0 12 01.9713	0 17 00	0 17 02.7927
10	11.9987	10	12.8200
20	22.0261	20	22.8474
30	32.0534	30	32.8748
40	42.0808	40	42.9022
50	52.1082	50	52.9296
0 13 00	0 13 02.1356	0 18 00	0 18 02.9569
10	12.1629	10	12.9843
20	22.1903	20	23.0117
30	32.2177	30	33.0391
40	42.2451	40	43.0665
50	52.2725	50	53.0938
0 14 00	0 14 02.2998	0 19 00	0 19 03.1212
10	12.3272	10	13.1486
20	22.3546	20	23.1760
30	32.3820	30	33.2034
40	42.4094	40	43.2307
50	52.4367	50	53.2581



Sidereal.	Solar.	Sidereal.	Solar.
0 10 00	0 09 58.3617	0 15 00	0 14 57.5426
10	0 10 08.3344	10	0 15 07.5153
20	18.3071	20	17.4880
30	28.2798	30	27.4607
40	38.2525	40	37.4334
50	48.2252	50	47.4061
0 11 00	58.1979	0 16 00	57.3788
10	0 11 08.1706	10	0 16 07.3515
20	18.1433	20	17.3242
30	28.1160	30	27.2969
40	38.0887	40	37.2696
50	48.0614	50	47.2423
0 12 00	58.0341	0 17 00	57.2150
10	0 12 08.0068	10	0 17 07.1877
20	17.9795	20	17.1603
30	27.9522	30	27.1330
40	37.9249	40	37.1057
50	47.8976	50	47.0784
0 13 00	57.8703	0 18 00	57.0511
10	0 13 07.8430	10	0 18 07.0238
20	17.8157	20	16.9965
30	27.7883	30	26.9692
40	37.7610	40	36.9419
50	47.7337	50	46.9146
0 14 00	57.7064	0 19 00	56.8873
10	0 14 07.6791	10	0 19 06.8600
20	17.6518	20	16.8327
30	27.6245	30	26.8054
40	37.5972	40	36.7781
50	47.5699	50	46.7508

Solar.	Sidereal.	Solar.	Sidereal.
0 20 00	0 20 03.2855	0 25 00	0 25 04.1069
10	13.3129	10	14.1342
20	23.3402	20	24.1616
30	33.3676	30	34.1890
40	43.3950	40	44.2164
50	53.4224	50	54.2438
0 21 00	0 21 03.4498	0 26 00	0 26 04.2711
10	13.4771	10	14.2985
20	23.5045	20	24.3259
30	33.5319	30	34.3533
40	43.5593	40	44.3807
50	53.5867	50	54.4080
0 22 00	0 22 03.6140	0 27 00	0 27 04.4354
10	13.6414	10	14.4628
20	23.6688	20	24.4902
30	33.6962	30	34.5176
40	43.7236	40	44.5449
50	53.7509	50	54.5723
0 23 00	0 23 03.7783	0 28 00	0 28 04.5997
10	13.8057	10	14.6271
20	23.8331	20	24.6544
30	33.8605	30	34.6818
40	43.8878	40	44.7092
50	53.9152	50	54.7366
0 24 00	0 24 03.9426	0 29 00	0 29 04.7640
10	13.9700	10	14.7913
20	23.9973	20	24.8187
30	34.0247	30	34.8461
40	44.0521	40	44.8735
50	54.0795	50	54.9009

Sidereal.	Solar.	Sidereal.	Solar.
0 20 00	0 19 56.7235	0 25 00	0 24 55.9043
10	0 20 06.6962	10	0 25 05.8770
20	16.6689	20	15.8497
30	26.6416	30	25.8224
40	36.6143	40	35.7951
50	46.5870	50	45.7678
0 21 00	56.5597	0 26 00	55.7405
10	0 21 06.5323	10	0 26 05.7132
20	16.5050	20	15.6859
30	26.4777	30	25.6586
40	36.4504	40	35.6313
50	46.4231	50	45.6040
0 22 00	56.3958	0 27 00	55.5767
10	0 22 06.3685	10	0 27 05.5494
20	16.3412	20	15.5221
30	26.3139	30	25.4948
40	36.2866	40	35.4675
50	46.2593	50	45.4402
0 23 00	56.2320	0 28 00	55.4129
10	0 23 06.2047	10	0 28 05.3856
20	16.1774	20	15.3583
30	26.1501	30	25.3310
40	36.1228	40	35.3037
50	46.0955	50	45.2764
0 24 00	56.0682	0 29 00	55.2490
10	0 24 06.0409	10	0 29 05.2217
20	16.0136	20	15.1944
30	25.9863	30	25.1671
40	35.9590	40	35.1398
50	45.9317	50	45.1125

Solar.	Sidereal.	Solar.	Sidereal.
0 30 00	0 30 04.9282	0 35 00	0 35 05.7496
10	14.9556	10	15.7770
20	24.9830	20	25.8044
30	35.0104	30	35.8317
40	45.0378	40	45.8591
50	55.0651	50	55.8865
0 31 00	0 31 05.0925	0 36 00	0 36 05.9139
10	15.1199	10	15.9413
20	25.1473	20	25.9686
30	35.1746	30	35.9960
40	45.2020	40	46.0234
50	55.2294	50	56.0508
0 32 00	0 32 05.2568	0 37 00	0 37 06.0782
10	15.2842	10	16.1055
20	25.3115	20	26.1329
30	35.3389	30	36.1603
40	45.3663	40	46.1877
50	55.3937	50	56.2151
0 33 00	0 33 05.4211	0 38 00	0 38 06.2424
10	15.4484	10	16.2698
20	25.4758	20	26.2972
30	35.5032	30	36.3246
40	45.5306	40	46.3519
50	55.5580	50	56.3793
0 34 00	0 34 05.5853	0 39 00	0 39 06.4067
10	15.6127	10	16.4341
20	25.6401	20	26.4615
30	35.6675	30	36.4888
40	45.6949	40	46.5162
50	55.7222	50	56.5436

Sidereal.	Solar.	Sidereal.	Solar.
0 30 00	0 29 55.0852	0 35 00	0 34 54.2661
10	0 30 05.0579	10	0 35 04.2388
20	15.0306	20	14.2115
30	25.0033	30	24.1842
40	34.9760	40	34.1569
50	44.9487	50	44.1296
0 31 00	54.9214	0 36 00	54.1023
10	0 31 04.8941	10	0 36 04.0750
20	14.8668	20	14.0477
30	24.8395	30	24.0204
40	34.8122	40	33.9930
50	44.7849	50	43.9657
0 32 00	54.7576	0 37 00	53.9384
10	0 32 04.7303	10	0 37 03.9111
20	14.7030	20	13.8838
30	24.6757	30	23.8565
40	34.6484	40	33.8292
50	44.6210	50	43.8019
0 33 00	54.5937	0 38 00	53.7746
10	0 33 04.5664	10	0 38 03.7473
20	14.5391	20	13.7200
30	24.5118	30	23.6927
40	34.4845	40	33.6654
50	44.4572	50	43.6381
0 34 00	54.4299	0 39 00	53.6108
10	0 34 04.4026	10	0 39 03.5835
20	14.3753	20	13.5562
30	24.3480	30	23.5289
40	34.3207	40	33.5016
50	44.2934	50	43.4743

Solar.	Sidereal.	Solar.	Sidereal.
0 40 00	0 40 06.5710	0 45 00	0 45 07.3924
10	16.5984	10	17.4197
20	26.6257	20	27.4471
30	36.6531	30	37.4745
40	46.6805	40	47.5019
50	56.7079	50	57.5293
0 41 00	0 41 06.7353	0 46 00	0 46 07.5566
10	16.7626	10	17.5840
20	26.7900	20	27.6114
30	36.8174	30	37.6388
40	46.8448	40	47.6661
50	56.8722	50	57.6935
0 42 00	0 42 06.8995	0 47 00	0 47 07.7209
10	16.9269	10	17.7483
20	26.9543	20	27.7757
30	36.9817	30	37.8030
40	47.0090	40	47.8304
50	57.0364	50	57.8578
0 43 00	0 43 07.0638	0 48 00	0 48 07.8852
10	17.0912	10	17.9126
20	27.1186	20	27.9399
30	37.1459	30	37.9673
40	47.1733	40	47.9947
50	57.2007	50	58.0221
0 44 00	0 44 07.2281	0 49 00	0 49 08.0495
10	17.2555	10	18.0768
20	27.2828	20	28.1042
30	37.3102	30	38.1316
40	47.3376	40	48.1590
50	57.3650	50	58.1863

Sidereal.	Solar.	Sidereal.	Solar.
0 40 00	0 39 53.4470	0 45 00	0 44 52.6278
10	0 40 03.4197	10	0 45 02.6005
20	13.3924	20	12.5732
30	23.3650	30	22.5459
40	33.3377	40	32.5186
50	43.3104	50	42.4913
0 41 00	53.2831	0 46 00	52.4640
10	0 41 03.2558	10	0 46 02.4367
20	13.2285	20	12.4094
30	23.2012	30	22.3821
40	33.1739	40	32.3548
50	43.1466	50	42.3275
0 42 00	53.1193	0 47 00	52.3002
10	0 42 03.0920	10	0 47 02.2729
20	13.0647	20	12.2456
30	23.0374	30	22.2183
40	33.0101	40	32.1910
50	42.9828	50	42.1637
0 43 00	52.9555	0 48 00	52.1364
10	0 43 02.9282	10	0 48 02.1090
20	12.9009	20	12.0817
30	22.8736	30	22.0544
40	32.8463	40	32.0271
50	42.8190	50	41.9998
0 44 00	52.7917	0 49 00	51.9725
10	0 44 02.7644	10	0 49 01.9452
20	12.7370	20	11.9179
30	22.7097	30	21.8906
40	32.6824	40	31.8633
50	42.6551	50	41.8360

Solar.	Sidereal.	Solar.	Sidereal.
0 50 00	0 50 08.2137	0 55 00	0 55 09.0351
10	18.2411	10	19.0625
20	28.2685	20	29.0899
30	38.2959	30	39.1172
40	48.3232	40	49.1446
50	58.3506	50	59.1720
0 51 00	0 51 08.3780	0 56 00	0 56 09.1994
10	18.4054	10	19.2268
20	28.4328	20	29.2541
30	38.4601	30	39.2815
40	48.4875	40	49.3089
50	58.5149	50	59.3363
0 52 00	0 52 08.5423	0 57 00	0 57 09.3636
10	18.5697	10	19.3910
20	28.5970	20	29.4184
30	38.6244	30	39.4458
40	48.6518	40	49.4732
50	58.6792	50	59.5005
0 53 00	0 53 08.7066	0 58 00	0 58 09.5279
10	18.7339	10	19.5553
20	28.7613	20	29.5827
30	38.7887	30	39.6101
40	48.8161	40	49.6374
50	58.8434	50	59.6648
0 54 00	0 54 08.8708	0 59 00	0 59 09.6922
10	18.8982	10	19.7196
20	28.9256	20	29.7470
30	38.9530	30	39.7743
40	48.9803	40	49.8017
50	59.0077	50	59.8291



Sidereal.	Solar.	Sidereal.	Solar.
0 50 00	0 49 51.8087	0 55 00	0 54 50.9896
10	0 50 01.7814	10	0 55 00.9623
20	11.7541	20	10.9350
30	21.7268	30	20.9077
40	31.6995	40	30.8804
50	41.6722	50	40.8530
0 51 00	51.6449	0 56 00	50.8257
10	0 51 01.6176	10	0 56 00.7984
20	11.5903	20	10.7711
30	21.5630	30	20.7438
40	31.5357	40	30.7165
50	41.5084	50	40.6892
0 52 00	51.4810	0 57 00	50.6619
10	0 52 01.4537	10	0 57 00.6346
20	11.4264	20	10.6073
30	21.3991	30	20.5800
40	31.3718	40	30.5527
50	41.3445	50	40.5254
0 53 00	51.3172	0 58 00	50.4981
10	0 53 01.2899	10	0 58 00.4708
20	11.2626	20	10.4435
30	21.2353	30	20.4162
40	31.2080	40	30.3889
50	41.1807	50	40.3616
0 54 00	51.1534	0 59 00	50.3343
10	0 54 01.1261	10	0 59 00.3070
20	11.0988	20	10.2797
30	21.0715	30	20.2524
40	31.0442	40	30.2250
50	41.0169	50	40.1977

Solar.	Sidereal.	Solar.	Sidereal.
1 00 00	1 00 09.8565	1 05 00	1 05 10.6778
10	19.8839	10	20.7052
20	29.9112	20	30.7326
30	39.9386	30	40.7600
40	49.9660	40	50.7874
50	59.9934	50	1 06 00.8147
1 01 00	1 01 10.0207	1 06 00	10.8421
10	20.0481	10	20.8695
20	30.0755	20	30.8969
30	40.1029	30	40.9243
40	50.1303	40	50.9516
50	1 02 00.1576	50	1 07 00.9790
1 02 00	10.1850	1 07 00	11.0064
10	20.2124	10	21.0338
20	30.2398	20	31.0612
30	40.2672	30	41.0885
40	50.2945	40	51.1159
50	1 03 00.3219	50	1 08 01.1433
1 03 00	10.3493	1 08 00	11.1707
10	20.3767	10	21.1980
20	30.4041	20	31.2254
30	40.4314	30	41.2528
40	50.4588	40	51.2802
50	1 04 00.4862	50	1 09 01.3076
1 04 00	10.5136	1 09 00	11.3349
10	20.5410	10	21.3623
20	30.5683	20	31.3897
30	40.5957	30	41.4171
40	50.6231	40	51.4445
50	1 05 00.6505	50	1 10 01.4718

Sidereal.	Solar.	Sidereal.	Solar.
1 00 00	0 59 50.1704	1 05 00	1 04 49.3513
10	1 00 00.1431	10	59.3240
20	10.1158	20	1 05 09.2967
30	20.0885	30	19.2694
40	30.0612	40	29.2421
50	40.0339	50	39.2148
1 01 00	50.0066	1 06 00	49.1875
10	59.9793	10	59.1602
20	1 01 09.9520	20	1 06 09.1329
30	19.9247	30	19.1056
40	29.8974	40	29.0783
50	39.8701	50	39.0510
1 02 00	49.8428	1 07 00	49.0237
10	59.8155	10	58.9964
20	1 02 09.7882	20	1 07 08.9690
30	19.7609	30	18.9417
40	29.7336	40	28.9144
50	39.7063	50	38.8871
1 03 00	49.6790	1 08 00	48.8598
10	59.6517	10	58.8325
20	1 03 09.6244	20	1 08 08.8052
30	19.5970	30	18.7779
40	29.5697	40	28.7506
50	39.5424	50	38.7233
1 04 00	49.5151	1 09 00	48.6960
10	59.4878	10	58.6687
20	1 04 09.4605	20	1 09 08.6414
30	19.4332	30	18.6141
40	29.4059	40	28.5868
50	39.3786	50	38.5595

Solar.	Sidereal.	Solar.	Sidereal.
1 10 00	1 10 11.4992	1 15 00	1 15 12.3206
10	21.5266	10	22.3480
20	31.5540	20	32.3753
30	41.5814	30	42.4027
40	51.6087	40	52.4301
50	1 11 01.6361	50	1 16 02.4575
1 11 00	11.6635	1 16 00	12.4849
10	21.6909	10	22.5122
20	31.7183	20	32.5396
30	41.7456	30	42.5670
40	51.7730	40	52.5944
50	1 12 01.8004	50	1 17 02.6218
1 12 00	11.8278	1 17 00	12.6491
10	21.8551	10	22.6765
20	31.8825	20	32.7039
30	41.9099	30	42.7313
40	51.9373	40	52.7587
50	1 13 01.9647	50	1 18 02.7860
1 13 00	11.9920	1 18 00	12.8134
10	22.0194	10	22.8408
20	32.0468	20	32.8682
30	42.0742	30	42.8956
40	52.1016	40	52.9229
50	1 14 02.1289	50	1 19 02.9503
1 14 00	12.1563	1 19 00	12.9777
10	22.1837	10	23.0051
20	32.2111	20	33.0324
30	42.2385	30	43.0598
40	52.2658	40	53.0872
50	1 15 02.2932	50	1 20 03.1146

Sidereal.	Solar.	Sidereal.	Solar.
1 10 00	1 09 48.5322	1 15 00	1 14 47.7130
10	58.5049	10	57.6857
20	1 10 08.4776	20	1 15 07.6584
30	18.4503	30	17.6311
40	28.4230	40	27.6038
50	38.3957	50	37.5765
1 11 00	48.3684	1 16 00	47.5492
10	58.3410	10	57.5219
20	1 11 08.3137	20	1 16 07.4946
30	18.2864	30	17.4673
40	28.2591	40	27.4400
50	38.2318	50	37.4127
1 12 00	48.2045	1 17 00	47.3854
10	58.1772	10	57.3581
20	1 12 08.1499	20	1 17 07.3308
30	18.1226	30	17.3035
40	28.0953	40	27.2762
50	38.0680	50	37.2489
1 13 00	48.0407	1 18 00	47.2216
10	58.0134	10	57.1943
20	1 13 07.9861	20	1 18 07.1670
30	17.9588	30	17.1397
40	27.9315	40	27.1124
50	37.9042	50	37.0850
1 14 00	47.8769	1 19 00	47.0577
10	57.8496	10	57.0304
20	1 14 07.8223	20	1 19 07.0031
30	17.7950	30	16.9758
40	27.7677	40	26.9485
50	37.7404	50	36.9212

Solar.	Sidereal.	Solar.	Sidereal.
1 20 00	1 20 13.1420	1 25 00	1 25 13.9633
10	23.1693	10	23.9907
20	33.1967	20	34.0181
30	43.2241	30	44.0455
40	53.2515	40	54.0729
50	1 21 03.2789	50	1 26 04.1002
1 21 00	13.3062	1 26 00	14.1276
10	23.3336	10	24.1550
20	33.3610	20	34.1824
30	43.3884	30	44.2097
40	53.4158	40	54.2371
50	1 22 03.4431	50	1 27 04.2645
1 22 00	13.4705	1 27 00	14.2919
10	23.4979	10	24.3193
20	33.5253	20	34.3466
30	43.5527	30	44.3740
40	53.5800	40	54.4014
50	1 23 03.6074	50	1 28 04.4288
1 23 00	13.6348	1 28 00	14.4562
10	23.6622	10	24.4835
20	33.6895	20	34.5109
30	43.7169	30	44.5383
40	53.7443	40	54.5657
50	1 24 03.7717	50	1 29 04.5931
1 24 00	13.7991	1 29 00	14.6204
10	23.8264	10	24.6478
20	33.8538	20	34.6752
30	43.8812	30	44.7026
40	53.9086	40	54.7300
50	1 25 03.9360	50	1 30 04.7573

Sidereal.	Solar.	Sidereal.	Solar.
1 20 00	1 19 46.8939	1 25 00	1 24 46.0748
10	56.8666	10	56.0475
20	1 20 06.8393	20	1 25 06.0202
30	16.8120	30	15.9929
40	26.7847	40	25.9656
50	36.7574	50	35.9383
1 21 00	46.7301	1 26 00	45.9110
10	56.7028	10	55.8837
20	1 21 06.6755	20	1 26 05.8564
30	16.6482	30	15.8291
40	26.6209	40	25.8017
50	36.5936	50	35.7744
1 22 00	46.5663	1 27 00	45.7471
10	56.5390	10	55.7198
20	1 22 06.5117	20	1 27 05.6925
30	16.4844	30	15.6652
40	26.4571	40	25.6379
50	36.4297	50	35.6106
1 23 00	46.4024	1 28 00	45.5833
10	56.3751	10	55.5560
20	1 23 06.3478	20	1 28 05.5287
30	16.3205	30	15.5014
40	26.2932	40	25.4741
50	36.2659	50	35.4468
1 24 00	46.2386	1 29 00	45.4195
10	56.2113	10	55.3922
20	1 24 06.1840	20	1 29 05.3649
30	16.1567	30	15.3376
40	26.1294	40	25.3103
50	36.1021	50	35.2830

Solar.	Sidereal.	Solar.	Sidereal.
1 30 00	1 30 14.7847	1 35 00	1 35 15.6061
10	24.8121	10	25.6335
20	34.8395	20	35.6608
30	44.8668	30	45.6882
40	54.8942	40	55.7156
50	1 31 04.9216	50	1 36 05.7430
1 31 00	14.9490	1 36 00	15.7704
10	24.9764	10	25.7977
20	35.0037	20	35.8251
30	45.0311	30	45.8525
40	55.0585	40	55.8799
50	1 32 05.0859	50	1 37 05.9073
1 32 00	15.1133	1 37 00	15.9346
10	25.1406	10	25.9620
20	35.1680	20	35.9894
30	45.1954	30	46.0168
40	55.2228	40	56.0441
50	1 33 05.2502	50	1 38 06.0715
1 33 00	15.2775	1 38 00	16.0989
10	25.3049	10	26.1263
20	35.3323	20	36.1537
30	45.3597	30	46.1810
40	55.3870	40	56.2084
50	1 34 05.4144	50	1 39 06.2358
1 34 00	15.4418	1 39 00	16.2632
10	25.4692	10	26.2906
20	35.4966	20	36.3179
30	45.5239	30	46.3453
40	55.5513	40	56.3727
50	1 35 05.5787	50	1 40 06.4001



Sidereal.	Solar.	Sidereal.	Solar.
1 30 00	1 29 45.2557	1 35 00	1 34 44.4365
10	55.2284	10	54.4092
20	1 30 05.2011	20	1 35 04.3819
30	15.1737	30	14.3546
40	25.1464	40	24.3273
50	35.1191	50	34.3000
1 31 00	45.0918	1 36 00	44.2727
10	55.0645	10	54.2454
20	1 31 05.0372	20	1 36 04.2181
30	15.0099	30	14.1908
40	24.9826	40	24.1635
50	34.9553	50	34.1362
1 32 00	44.9280	1 37 00	44.1089
10	54.9007	10	54.0816
20	1 32 04.8734	20	1 37 04.0543
30	14.8461	30	14.0270
40	24.8188	40	23.9997
50	34.7915	50	33.9724
1 33 00	44.7642	1 38 00	43.9451
10	54.7369	10	53.9177
20	1 33 04.7096	20	1 38 03.8904
30	14.6823	30	13.8631
40	24.6550	40	23.8358
50	34.6277	50	33.8085
1 34 00	44.6004	1 39 00	43.7812
10	54.5731	10	53.7539
20	1 34 04.5457	20	1 39 03.7266
30	14.5184	30	13.6993
40	24.4911	40	23.6720
50	34.4638	50	33.6447

Solar.	Sidereal.	Solar.	Sidereal.
1 40 00	1 40 16.4275	1 45 00	1 45 17.2488
10	26.4548	10	27.2762
20	36.4822	20	37.3036
30	46.5096	30	47.3310
40	56.5370	40	57.3583
50	1 41 06.5644	50	1 46 07.3857
1 41 00	16.5917	1 46 00	17.4131
10	26.6191	10	27.4405
20	36.6465	20	37.4679
30	46.6739	30	47.4952
40	56.7012	40	57.5226
50	1 42 06.7286	50	1 47 07.5500
1 42 00	16.7560	1 47 00	17.5774
10	26.7834	10	27.6048
20	36.8108	20	37.6321
30	46.8381	30	47.6595
40	56.8655	40	57.6869
50	1 43 06.8929	50	1 48 07.7143
1 43 00	16.9203	1 48 00	17.7417
10	26.9477	10	27.7690
20	36.9750	20	37.7964
30	47.0024	30	47.8238
40	57.0298	40	57.8512
50	1 44 07.0572	50	1 49 07.8785
1 44 00	17.0846	1 49 00	17.9059
10	27.1119	10	27.9333
20	37.1393	20	37.9607
30	47.1667	30	47.9881
40	57.1941	40	58.0154
50	1 45 07.2214	50	1 50 08.0428

Sidereal.	Solar.	Sidereal.	Solar.
1 40 00	1 39 43.6174	1 45 00	1 44 42.7983
10	53.5901	10	52.7710
20	1 40 03.5628	20	1 45 02.7437
30	13.5355	30	12.7164
40	23.5082	40	22.6891
50	33.4809	50	32.6617
1 41 00	43.4536	1 46 00	42.6344
10	53.4263	10	52.6071
20	1 41 03.3990	20	1 46 02.5798
30	13.3717	30	12.5525
40	23.3444	40	22.5252
50	33.3171	50	32.4979
1 42 00	43.2897	1 47 00	42.4706
10	53.2624	10	52.4433
20	1 42 03.2351	20	1 47 02.4160
30	13.2078	30	12.3887
40	23.1805	40	22.3614
50	33.1532	50	32.3341
1 43 00	43.1259	1 48 00	42.3068
10	53.0986	10	52.2795
20	1 43 03.0713	20	1 48 02.2522
30	13.0440	30	12.2249
40	23.0167	40	22.1976
50	32.9894	50	32.1703
1 44 00	42.9621	1 49 00	42.1430
10	52.9348	10	52.1157
20	1 44 02.9075	20	1 49 02.0884
30	12.8802	30	12.0611
40	22.8529	40	22.0337
50	32.8256	50	32.0064

Solar.	Sidereal.	Solar.	Sidereal.
1 50 00	1 50 18.0702	1 55 00	1 55 18.8916
10	28.0976	10	28.9190
20	38.1250	20	38.9463
30	48.1523	30	48.9737
40	58.1797	40	59.0011
50	1 51 08.2071	50	1 56 09.0285
1 51 00	18.2345	1 56 00	19.0558
10	28.2619	10	29.0832
20	38.2892	20	39.1106
30	48.3166	30	49.1380
40	58.3440	40	59.1654
50	1 52 08.3714	50	1 57 09.1927
1 52 00	18.3987	1 57 00	19.2201
10	28.4261	10	29.2475
20	38.4535	20	39.2749
30	48.4809	30	49.3023
40	58.5083	40	59.3296
50	1 53 08.5356	50	1 58 09.3570
1 53 00	18.5630	1 58 00	19.3844
10	28.5904	10	29.4118
20	38.6178	20	39.4392
30	48.6452	30	49.4665
40	58.6725	40	59.4939
50	1 54 08.6999	50	1 59 09.5213
1 54 00	18.7273	1 59 00	19.5487
10	28.7547	10	29.5761
20	38.7821	20	39.6034
30	48.8094	30	49.6308
40	58.8368	40	59.6582
50	1 55 08.8642	50	2 00 09.6856

Sidereal.	Solar.	Sidereal.	Solar.
1 50 00	1 49 41.9791	1 55 00	1 54 41.1600
10	51.9518	10	51.1327
20	1 50 01.9245	20	1 55 01.1054
30	11.8972	30	11.0781
40	21.8699	40	21.0508
50	31.8426	50	31.0235
1 51 00	41.8153	1 56 00	40.9962
10	51.7880	10	50.9689
20	1 51 01.7607	20	1 56 00.9416
30	11.7334	30	10.9143
40	21.7061	40	20.8870
50	31.6788	50	30.8597
1 52 00	41.6515	1 57 00	40.8324
10	51.6242	10	50.8051
20	1 52 01.5969	20	1 57 00.7777
30	11.5696	30	10.7504
40	21.5423	40	20.7231
50	31.5150	50	30.6958
1 53 00	41.4877	1 58 00	40.6685
10	51.4604	10	50.6412
20	1 53 01.4331	20	1 58 00.6139
30	11.4057	30	10.5866
40	21.3784	40	20.5593
50	31.3511	50	30.5320
1 54 00	41.3238	1 59 00	40.5047
10	51.2965	10	50.4774
20	1 54 01.2692	20	1 59 00.4501
30	11.2419	30	10.4228
40	21.2146	40	20.3955
50	31.1873	50	30.3682

Solar.	Sidereal.	Solar.	Sidereal.
2 00 00	2 00 19.7129	2 05 00	2 05 20.5343
10	29.7403	10	30.5617
20	39.7677	20	40.5891
30	49.7951	30	50.6165
40	59.8225	40	2 06 00.6438
50	2 01 09.8498	50	10.6712
2 01 00	19.8772	2 06 00	20.6986
10	29.9046	10	30.7260
20	39.9320	20	40.7534
30	49.9594	30	50.7807
40	59.9867	40	2 07 00.8081
50	2 02 10.0141	50	10.8355
2 02 00	20.0415	2 07 00	20.8629
10	30.0689	10	30.8902
20	40.0963	20	40.9176
30	50.1236	30	50.9450
40	2 03 00.1510	40	2 08 00.9724
50	10.1784	50	10.9998
2 03 00	20.2058	2 08 00	21.0271
10	30.2331	10	31.0545
20	40.2605	20	41.0819
30	50.2879	30	51.1093
40	2 04 00.3153	40	2 09 01.1367
50	10.3427	50	11.1640
2 04 00	20.3700	2 09 00	21.1914
10	30.3974	10	31.2188
20	40.4248	20	41.2462
30	50.4522	30	51.2736
40	2 05 00.4796	40	2 10 01.3009
50	10.5069	50	11.3283

Sidereal.	Solar.	Sidereal.	Solar.
2 00 00	1 59 40.3409	2 05 00	2 04 39.5217
10	50.3136	10	49.4944
20	2 00 00.2863	20	59.4671
30	10.2590	30	2 05 09.4398
40	20.2317	40	19.4125
50	30.2044	50	29.3852
2 01 00	40.1771	2 06 00	39.3579
10	50.1497	10	49.3306
20	2 01 00.1224	20	59.3033
30	10.0951	30	2 06 09.2760
40	20.0678	40	19.2487
50	30.0405	50	29.2214
2 02 00	40.0132	2 07 00	39.1941
10	49.9859	10	49.1668
20	59.9586	20	59.1395
30	2 02 09.9313	30	2 07 09.1122
40	19.9040	40	19.0849
50	29.8767	50	29.0576
2 03 00	39.8494	2 08 00	39.0303
10	49.8221	10	49.0030
20	59.7948	20	58.9757
30	2 03 09.7675	30	2 08 08.9484
40	19.7402	40	18.9211
50	29.7129	50	28.8937
2 04 00	39.6856	2 09 00	38.8664
10	49.6583	10	48.8391
20	59.6310	20	58.8118
30	2 04 09.6037	30	2 09 08.7845
40	19.5764	40	18.7572
50	29.5491	50	28.7299

Solar.	Sidereal.	Solar.	Sidereal.
2 10 00	2 10 21.3557	2 15 00	2 15 22.1771
10	31.3831	10	32.2044
20	41.4104	20	42.2318
30	51.4378	30	52.2592
40	2 11 01.4652	40	2 16 02.2866
50	11.4926	50	12.3140
2 11 00	21.5200	2 16 00	22.3413
10	31.5473	10	32.3687
20	41.5747	20	42.3961
30	51.6021	30	52.4235
40	2 12 01.6295	40	2 17 02.4509
50	11.6569	50	12.4782
2 12 00	21.6842	2 17 00	22.5056
10	31.7116	10	32.5330
20	41.7390	20	42.5604
30	51.7664	30	52.5878
40	2 13 01.7938	40	2 18 02.6151
50	11.8211	50	12.6425
2 13 00	21.8485	2 18 00	22.6699
10	31.8759	10	32.6973
20	41.9033	20	42.7246
30	51.9307	30	52.7520
40	2 14 01.9580	40	2 19 02.7794
50	11.9854	50	12.8068
2 14 00	22.0128	2 19 00	22.8342
10	32.0402	10	32.8615
20	42.0675	20	42.8889
30	52.0949	30	52.9163
40	2 15 02.1223	40	2 20 02.9437
50	12.1497	50	12.9711



Sidereal.	Solar.	Sidereal.	Solar.
2 10 00	2 09 38.7026	2 15 00	2 14 37.8835
10	48.6753	10	47.8562
20	58.6480	20	57.8289
30	2 10 08.6207	30	2 15 07.8016
40	18.5934	40	17.7743
50	28.5661	50	27.7470
2 11 00	38.5388	2 16 00	37.7197
10	48.5115	10	47.6924
20	58.4842	20	57.6651
30	2 11 08.4569	30	2 16 07.6378
40	18.4296	40	17.6104
50	28.4023	50	27.5831
2 12 00	38.3750	2 17 00	37.5558
10	48.3477	10	47.5285
20	58.3204	20	57.5012
30	2 12 08.2931	30	2 17 07.4739
40	18.2657	40	17.4466
50	28.2384	50	27.4193
2 13 00	38.2111	2 18 00	37.3920
10	48.1838	10	47.3647
20	58.1565	20	57.3374
30	2 13 08.1292	30	2 18 07.3101
40	18.1019	40	17.2828
50	28.0746	50	27.2555
2 14 00	38.0473	2 19 00	37.2282
10	48.0200	10	47.2009
20	57.9927	20	57.1736
30	2 14 07.9654	30	2 19 07.1463
40	17.9381	40	17.1190
50	27.9108	50	27.0917

Solar.	Sidereal.	Solar.	Sidereal.
2 20 00	2 20 22.9984	2 25 00	2 25 23.8198
10	33.0258	10	33.8472
20	43.0532	20	43.8746
30	53.0806	30	53.9019
40	2 21 03.1080	40	2 26 03.9293
50	13.1353	50	13.9567
2 21 00	23.1627	2 26 00	23.9841
10	33.1901	10	34.0115
20	43.2175	20	44.0388
30	53.2448	30	54.0662
40	2 22 03.2722	40	2 27 04.0936
50	13.2996	50	14.1210
2 22 00	23.3270	2 27 00	24.1484
10	33.3544	10	34.1757
20	43.3817	20	44.2031
30	53.4091	30	54.2305
40	2 23 03.4365	40	2 28 04.2579
50	13.4639	50	14.2853
2 23 00	23.4913	2 28 00	24.3126
10	33.5186	10	34.3400
20	43.5460	20	44.3674
30	53.5734	30	54.3948
40	2 24 03.6008	40	2 29 04.4221
50	13.6282	50	14.4495
2 24 00	23.6555	2 29 00	24.4769
10	33.6829	10	34.5043
20	43.7103	20	44.5317
30	53.7377	30	54.5590
40	2 25 03.7651	40	2 30 04.5864
50	13.7924	50	14.6138

Sidereal.	Solar.	Sidereal.	Solar.
2 20 00	2 19 37.0644	2 25 00	2 24 36.2452
10	47.0371	10	46.2179
20	57.0098	20	56.1906
30	2 20 06.9824	30	2 25 06.1633
40	16.9551	40	16.1360
50	26.9278	50	26.1087
2 21 00	36.9005	2 26 00	36.0814
10	46.8732	10	46.0541
20	56.8459	20	56.0268
30	2 21 06.8186	30	2 26 05.9995
40	16.7913	40	15.9722
50	26.7640	50	25.9449
2 22 00	36.7367	2 27 00	35.9176
10	46.7094	10	45.8903
20	56.6821	20	55.8630
30	2 22 06.6548	30	2 27 05.8357
40	16.6275	40	15.8084
50	26.6002	50	25.7811
2 23 00	36.5729	2 28 00	35.7538
10	46.5456	10	45.7264
20	56.5183	20	55.6991
30	2 23 06.4910	30	2 28 05.6718
40	16.4637	40	15.6445
50	26.4364	50	25.6172
2 24 00	36.4091	2 29 00	35.5899
10	46.3818	10	45.5626
20	56.3544	20	55.5353
30	2 24 06.3271	30	2 29 05.5080
40	16.2998	40	15.4807
50	26.2725	50	25.4534

Solar.	Sidereal.	Solar.	Sidereal.
2 30 00	24.6412	2 35 00	25.4626
10	34.6686	10	35.4899
20	44.6959	20	45.5173
30	54.7233	30	55.5447
40	2 31 04.7507	40	2 36 05.5721
50	14.7781	50	15.5995
2 31 00	24.8055	2 36 00	25.6268
10	34.8328	10	35.6542
20	44.8602	20	45.6816
30	54.8876	30	55.7090
40	2 32 04.9150	40	2 37 05.7363
50	14.9424	50	15.7637
2 32 00	24.9697	2 37 00	25.7911
10	34.9971	10	35.8185
20	45.0245	20	45.8459
30	55.0519	30	55.8732
40	2 33 05.0792	40	2 38 05.9006
50	15.1066	50	15.9280
2 33 00	25.1340	2 38 00	25.9554
10	35.1614	10	35.9828
20	45.1888	20	46.0101
30	55.2161	30	56.0375
40	2 34 05.2435	40	2 39 06.0649
50	15.2709	50	16.0923
2 34 00	25.2983	2 39 00	26.1197
10	35.3257	10	36.1470
20	45.3530	20	46.1744
30	55.3804	30	56.2018
40	2 35 05.4078	40	2 40 06.2292
50	15.4352	50	16.2565

Sidereal.	Solar.	Sidereal.	Solar.
2 30 00	2 29 35.4261	2 35 00	2 34 34.6070
10	45.3988	10	44.5797
20	55.3715	20	54.5524
30	2 30 05.3442	30	2 35 04.5251
40	15.3169	40	14.4978
50	25.2896	50	24.4704
2 31 00	35.2623	2 36 00	34.4431
10	45.2350	10	44.4158
20	55.2077	20	54.3885
30	2 31 05.1804	30	2 36 04.3612
40	15.1531	40	14.3339
50	25.1258	50	24.3066
2 32 00	35.0984	2 37 00	34.2793
10	45.0711	10	44.2520
20	55.0438	20	54.2247
30	2 32 05.0165	30	2 37 04.1974
40	14.9892	40	14.1701
50	24.9619	50	24.1428
2 33 00	34.9346	2 38 00	34.1155
10	44.9073	10	44.0882
20	54.8800	20	54.0609
30	2 33 04.8527	30	2 38 04.0336
40	14.8254	40	14.0063
50	24.7981	50	23.9790
2 34 00	34.7708	2 39 00	33.9517
10	44.7435	10	43.9244
20	54.7162	20	53.8971
30	2 34 04.6889	30	2 39 03.8698
40	14.6616	40	13.8424
50	24.6343	50	23.8151

Solar.	Sidereal.	Solar.	Sidereal.
2 40 00	2 40 26.2839	2 45 00	2 45 27.1053
10	36.3113	10	37.1327
20	46.3387	20	47.1601
30	56.3661	30	57.1874
40	2 41 06.3934	40	2 46 07.2148
50	16.4208	50	17.2422
2 41 00	26.4482	2 46 00	27.2696
10	36.4756	10	37.2970
20	46.5030	20	47.3243
30	56.5303	30	57.3517
40	2 42 06.5577	40	2 47 07.3791
50	16.5851	50	17.4065
2 42 00	26.6125	2 47 00	27.4338
10	36.6399	10	37.4612
20	46.6672	20	47.4886
30	56.6946	30	57.5160
40	2 43 06.7220	40	2 48 07.5434
50	16.7494	50	17.5707
2 43 00	26.7768	2 48 00	27.5981
10	36.8041	10	37.6255
20	46.8315	20	47.6529
30	56.8589	30	57.6803
40	2 44 06.8863	40	2 49 07.7076
50	16.9136	50	17.7350
2 44 00	26.9410	2 49 00	27.7624
10	36.9684	10	37.7898
20	46.9958	20	47.8172
30	57.0232	30	57.8445
40	2 45 07.0505	40	2 50 07.8719
50	17.0779	50	17.8993

Sidereal.	Solar.	Sidereal.	Solar.
2 40 00	2 39 33.7878	2 45 00	2 44 32.9687
10	43.7605	10	42.9414
20	53.7332	20	52.9141
30	2 40 03.7059	30	2 45 02.8868
40	13.6786	40	12.8595
50	23.6513	50	22.8322
2 41 00	33.6240	2 46 00	32.8049
10	43.5967	10	42.7776
20	53.5694	20	52.7503
30	2 41 03.5421	30	2 46 02.7230
40	13.5148	40	12.6957
50	23.4875	50	22.6684
2 42 00	33.4602	2 47 00	32.6411
10	43.4329	10	42.6138
20	53.4056	20	52.5864
30	2 42 03.3783	30	2 47 02.5591
40	13.3510	40	12.5318
50	23.3237	50	22.5045
2 43 00	33.2964	2 48 00	32.4772
10	43.2691	10	42.4499
20	53.2418	20	52.4226
30	2 43 03.2144	30	2 48 02.3953
40	13.1871	40	12.3680
50	23.1598	50	22.3407
2 44 00	33.1325	2 49 00	32.3134
10	43.1052	10	42.2861
20	53.0779	20	52.2588
30	2 44 03.0506	30	2 49 02.2315
40	13.0233	40	12.2042
50	22.9960	50	22.1769

Solar.	Sidereal.	Solar.	Sidereal.
2 50 00	2 50 27.9267	2 55 00	2 55 28.7480
10	37.9541	10	38.7754
20	47.9814	20	48.8028
30	58.0088	30	58.8302
40	2 51 08.0362	40	2 56 08.8576
50	18.0636	50	18.8849
2 51 00	28.0909	2 56 00	28.9123
10	38.1183	10	38.9397
20	48.1457	20	48.9671
30	58.1731	30	58.9945
40	2 52 08.2005	40	2 57 09.0218
50	18.2278	50	19.0492
2 52 00	28.2552	2 57 00	29.0766
10	38.2826	10	39.1040
20	48.3100	20	49.1314
30	58.3374	30	59.1587
40	2 53 08.3647	40	2 58 09.1861
50	18.3921	50	19.2135
2 53 00	28.4195	2 58 00	29.2409
10	38.4469	10	39.2682
20	48.4743	20	49.2956
30	58.5016	30	59.3230
40	2 54 08.5290	40	2 59 09.3504
50	18.5564	50	19.3778
2 54 00	28.5838	2 59 00	29.4051
10	38.6112	10	39.4325
20	48.6385	20	49.4599
30	58.6659	30	59.4873
40	2 55 08.6933	40	3 00 09.5147
50	18.7207	50	19.5420



Sidereal.	Solar.	Sidereal.	Solar.
2 50 00	2 49 32.1496	2 55 00	2 54 31.3304
10	42.1223	10	41.3031
20	52.0950	20	51.2758
30	2 50 02.0677	30	2 55 01.2485
40	12.0404	40	11.2212
50	22.0131	50	21.1939
2 51 00	31.9858	2 56 00	31.1666
10	41.9584	10	41.1393
20	51.9311	20	51.1120
30	2 51 01.9038	30	2 56 01.0847
40	11.8765	40	11.0574
50	21.8492	50	21.0301
2 52 00	31.8219	2 57 00	31.0028
10	41.7946	10	40.9755
20	51.7673	20	50.9482
30	2 52 01.7400	30	2 57 00.9209
40	11.7127	40	10.8936
50	21.6854	50	20.8663
2 53 00	31.6581	2 58 00	30.8390
10	41.6308	10	40.8117
20	51.6035	20	50.7844
30	2 53 01.5762	30	2 58 00.7571
40	11.5489	40	10.7298
50	21.5216	50	20.7024
2 54 00	31.4943	2 59 00	30.6751
10	41.4670	10	40.6478
20	51.4397	20	50.6205
30	2 54 01.4124	30	2 59 00.5932
40	11.3851	40	10.5659
50	21.3578	50	20.5386

Solar.	Sidereal.	Solar.	Sidereal.
3 00 00	3 00 29.5694	3 05 00	3 05 30.3908
10	39.5968	10	40.4182
20	49.6242	20	50.4455
30	59.6516	30	3 06 00.4729
40	3 01 09.6789	40	10.5003
50	19.7063	50	20.5277
3 01 00	29.7337	3 06 00	30.5551
10	39.7611	10	40.5824
20	49.7885	20	50.6098
30	59.8158	30	3 07 00.6372
40	3 02 09.8432	40	10.6646
50	19.8706	50	20.6920
3 02 00	29.8980	3 07 00	30.7193
10	39.9253	10	40.7467
20	49.9527	20	50.7741
30	59.9801	30	3 08 00.8015
40	3 03 10.0075	40	10.8289
50	20.0349	50	20.8562
3 03 00	30.0622	3 08 00	30.8836
10	40.0896	10	40.9110
20	50.1170	20	50.9384
30	3 04 00.1444	30	3 09 00.9658
40	10.1718	40	10.9931
50	20.1991	50	21.0205
3 04 00	30.2265	3 09 00	31.0479
10	40.2539	10	41.0753
20	50.2813	20	51.1026
30	3 05 00.3087	30	3 10 01.1300
40	10.3360	40	11.1574
50	20.3634	50	21.1848

Sidereal.	Solar.	Sidereal.	Solar.
3 00 00	2 59 30.5113	3 05 00	3 04 29.6922
10	40.4840	10	39.6649
20	50.4567	20	49.6376
30	3 00 00.4294	30	59.6103
40	10.4021	40	3 05 09.5830
50	20.3748	50	19.5557
3 01 00	30.3475	3 06 00	29.5284
10	40.3202	10	39.5011
20	50.2929	20	49.4738
30	3 01 00.2656	30	59.4464
40	10.2383	40	3 06 09.4191
50	20.2110	50	19.3918
3 02 00	30.1837	3 07 00	29.3645
10	40.1564	10	39.3372
20	50.1291	20	49.3099
30	3 02 00.1018	30	59.2826
40	10.0744	40	3 07 09.2553
50	20.0471	50	19.2280
3 03 00	30.0198	3 08 00	29.2007
10	39.9925	10	39.1734
20	49.9652	20	49.1461
30	59.9379	30	59.1188
40	3 03 09.9106	40	3 08 09.0915
50	19.8833	50	19.0642
3 04 00	29.8560	3 09 00	29.0369
10	39.8287	10	39.0096
20	49.8014	20	48.9823
30	59.7741	30	58.9550
40	3 04 09.7468	40	3 09 08.9277
50	19.7195	50	18.9004

Solar.	Sidereal.	Solar.	Sidereal.
3 10 00	3 10 31.2122	3 15 00	3 15 32.0335
10	41.2395	10	42.0609
20	51.2669	20	52.0883
30	3 11 01.2943	30	3 16 02.1157
40	11.3217	40	12.1431
50	21.3491	50	22.1704
3 11 00	31.3764	3 16 00	32.1978
10	41.4038	10	42.2252
20	51.4312	20	52.2526
30	3 12 01.4586	30	3 17 02.2799
40	11.4860	40	12.3073
50	21.5133	50	22.3347
3 12 00	31.5407	3 17 00	32.3621
10	41.5681	10	42.3895
20	51.5955	20	52.4168
30	3 13 01.6229	30	3 18 02.4442
40	11.6502	40	12.4716
50	21.6776	50	22.4990
3 13 00	31.7050	3 18 00	32.5264
10	41.7324	10	42.5537
20	51.7597	20	52.5811
30	3 14 01.7871	30	3 19 02.6085
40	11.8145	40	12.6359
50	21.8419	50	22.6633
3 14 00	31.8693	3 19 00	32.6906
10	41.8966	10	42.7180
20	51.9240	20	52.7454
30	3 15 01.9514	30	3 20 02.7728
40	11.9788	40	12.8002
50	22.0062	50	22.8275

Sidereal.	Solar.	Sidereal.	Solar.
3 10 00	3 09 28.8731	3 15 00	3 14 28.0539
10	38.8458	10	38.0266
20	48.8185	20	47.9993
30	58.7911	30	57.9720
40	3 10 08.7638	40	3 15 07.9447
50	18.7365	50	17.9174
3 11 00	28.7092	3 16 00	27.8901
10	38.6819	10	37.8628
20	48.6546	20	47.8355
30	58.6273	30	57.8082
40	3 11 08.6000	40	3 16 07.7809
50	18.5727	50	17.7536
3 12 00	28.5454	3 17 00	27.7263
10	38.5181	10	37.6990
20	48.4908	20	47.6717
30	58.4635	30	57.6444
40	3 12 08.4362	40	3 17 07.6171
50	18.4089	50	17.5898
3 13 00	28.3816	3 18 00	27.5625
10	38.3543	10	37.5351
20	48.3270	20	47.5078
30	58.2997	30	57.4805
40	3 13 08.2724	40	3 18 07.4532
50	18.2451	50	17.4259
3 14 00	28.2178	3 19 00	27.3986
10	38.1905	10	37.3713
20	48.1631	20	47.3440
30	58.1358	30	57.3167
40	3 14 08.1085	40	3 19 07.2894
50	18.0812	50	17.2621

Solar.	Sidereal.	Solar.	Sidereal.
3 20 00	3 20 32.8549	3 25 00	3 25 33.6763
10	42.8823	10	43.7037
20	52.9097	20	53.7310
30	3 21 02.9370	30	3 26 03.7584
40	12.9644	40	13.7858
50	22.9918	50	23.8132
3 21 00	33.0192	3 26 00	33.8406
10	43.0466	10	43.8679
20	53.0739	20	53.8953
30	3 22 03.1013	30	3 27 03.9227
40	13.1287	40	13.9501
50	23.1561	50	23.9775
3 22 00	33.1835	3 27 00	34.0048
10	43.2108	10	44.0322
20	53.2382	20	54.0596
30	3 23 03.2656	30	3 28 04.0870
40	13.2930	40	14.1143
50	23.3204	50	24.1417
3 23 00	33.3477	3 28 00	34.1691
10	43.3751	10	44.1965
20	53.4025	20	54.2239
30	3 24 03.4299	30	3 29 04.2512
40	13.4572	40	14.2786
50	23.4846	50	24.3060
3 24 00	33.5120	3 29 00	34.3334
10	43.5394	10	44.3608
20	53.5668	20	54.3881
30	3 25 03.5941	30	3 30 04.4155
40	13.6215	40	14.4429
50	23.6489	50	24.4703

Sidereal.	Solar.	Sidereal.	Solar.
3 20 00	3 19 27.2348	3 25 00	3 24 26.4157
10	37.2075	10	36.3884
20	47.1802	20	46.3611
30	57.1529	30	56.3338
40	3 20 07.1256	40	3 25 06.3065
50	17.0983	50	16.2791
3 21 00	27.0710	3 26 00	26.2518
10	37.0437	10	36.2245
20	47.0164	20	46.1972
30	56.9891	30	56.1699
40	3 21 06.9618	40	3 26 06.1426
50	16.9345	50	16.1153
3 22 00	26.9071	3 27 00	26.0880
10	36.8798	10	36.0607
20	46.8525	20	46.0334
30	56.8252	30	56.0061
40	3 22 06.7979	40	3 27 05.9788
50	16.7706	50	15.9515
3 23 00	26.7433	3 28 00	25.9242
10	36.7160	10	35.8969
20	46.6887	20	45.8696
30	56.6614	30	55.8423
40	3 23 06.6341	40	3 28 05.8150
50	16.6068	50	15.7877
3 24 00	26.5795	3 29 00	25.7604
10	36.5522	10	35.7331
20	46.5249	20	45.7058
30	56.4976	30	55.6785
40	3 24 06.4703	40	3 29 05.6511
50	16.4430	50	15.6238

Solar.	Sidereal.	Solar.	Sidereal.
3 30 00	3 30 34.4977	3 35 00	3 35 35.3190
10	44.5250	10	45.3464
20	54.5524	20	55.3738
30	3 31 04.5798	30	3 36 05.4012
40	14.6072	40	15.4285
50	24.6346	50	25.4559
3 31 00	34.6619	3 36 00	35.4833
10	44.6893	10	45.5107
20	54.7167	20	55.5381
30	3 32 04.7441	30	3 37 05.5654
40	14.7714	40	15.5928
50	24.7988	50	25.6202
3 32 00	34.8262	3 37 00	35.6476
10	44.8536	10	45.6750
20	54.8810	20	55.7023
30	3 33 04.9083	30	3 38 05.7297
40	14.9357	40	15.7571
50	24.9631	50	25.7845
3 33 00	34.9905	3 38 00	35.8119
10	45.0179	10	45.8392
20	55.0452	20	55.8666
30	3 34 05.0726	30	3 39 05.8940
40	15.1000	40	15.9214
50	25.1274	50	25.9487
3 34 00	35.1548	3 39 00	35.9761
10	45.1821	10	46.0035
20	55.2095	20	56.0309
30	3 35 05.2369	30	3 40 06.0583
40	15.2643	40	16.0856
50	25.2916	50	26.1130



Sidereal.	Solar.	Sidereal.	Solar.
3 30 00	3 29 25.5965	3 35 00	3 34 24.7774
10	35.5692	10	34.7501
20	45.5419	20	44.7228
30	55.5146	30	54.6955
40	3 30 05.4873	40	3 35 04.6682
50	15.4600	50	14.6409
3 31 00	25.4327	3 36 00	24.6136
10	35.4054	10	34.5863
20	45.3781	20	44.5590
30	55.3508	30	54.5317
40	3 31 05.3235	40	3 36 04.5044
50	15.2962	50	14.4771
3 32 00	25.2689	3 37 00	24.4498
10	35.2416	10	34.4225
20	45.2143	20	44.3951
30	55.1870	30	54.3678
40	3 32 05.1597	40	3 37 04.3405
50	15.1324	50	14.3132
3 33 00	25.1051	3 38 00	24.2859
10	35.0778	10	34.2586
20	45.0505	20	44.2313
30	55.0231	30	54.2040
40	3 33 04.9958	40	3 38 04.1767
50	14.9685	50	14.1494
3 34 00	24.9412	3 39 00	24.1221
10	34.9139	10	34.0948
20	44.8866	20	44.0675
30	54.8593	30	54.0402
40	3 34 04.8320	40	3 39 04.0129
50	14.8047	50	13.9856

Solar.	Sidereal.	Solar.	Sidereal.
3 40 00	3 40 36.1404	3 45 00	3 45 36.9618
10	46.1678	10	46.9892
20	56.1952	20	57.0165
30	3 41 06.2225	30	3 46 07.0439
40	16.2499	40	17.0713
50	26.2773	50	27.0987
3 41 00	36.3047	3 46 00	37.1260
10	46.3321	10	47.1534
20	56.3594	20	57.1808
30	3 42 06.3868	30	3 47 07.2082
40	16.4142	40	17.2356
50	26.4416	50	27.2629
3 42 00	36.4689	3 47 00	37.2903
10	46.4963	10	47.3177
20	56.5237	20	57.3451
30	3 43 06.5511	30	3 48 07.3725
40	16.5785	40	17.3998
50	26.6058	50	27.4272
3 43 00	36.6332	3 48 00	37.4546
10	46.6606	10	47.4820
20	56.6880	20	57.5094
30	3 44 06.7154	30	3 49 07.5367
40	16.7427	40	17.5641
50	26.7701	50	27.5915
3 44 00	36.7975	3 49 00	37.6189
10	46.8249	10	47.6463
20	56.8523	20	57.6736
30	3 45 06.8796	30	3 50 07.7010
40	16.9070	40	17.7284
50	26.9344	50	27.7558

Sidereal.	Solar.	Sidereal.	Solar.
3 40 00	3 39 23.9583	3 45 00	3 44 23.1391
10	33.9310	10	33.1118
20	43.9037	20	43.0845
30	53.8764	30	53.0572
40	3 40 03.8491	40	3 45 03.0299
50	13.8218	50	13.0026
3 41 00	23.7945	3 46 00	22.9753
10	33.7671	10	32.9480
20	43.7398	20	42.9207
30	53.7125	30	52.8934
40	3 41 03.6852	40	3 46 02.8661
50	13.6579	50	12.8388
3 42 00	23.6306	3 47 00	22.8115
10	33.6033	10	32.7842
20	43.5760	20	42.7569
30	53.5487	30	52.7296
40	3 42 03.5214	40	3 47 02.7023
50	13.4941	50	12.6750
3 43 00	23.4668	3 48 00	22.6477
10	33.4395	10	32.6204
20	43.4122	20	42.5931
30	53.3849	30	52.5658
40	3 43 03.3576	40	3 48 02.5385
50	13.3303	50	12.5111
3 44 00	23.3030	3 49 00	22.4838
10	33.2757	10	32.4565
20	43.2484	20	42.4292
30	53.2211	30	52.4019
40	3 44 03.1938	40	3 49 02.3746
50	13.1665	50	12.3473

Solar.	Sidereal.	Solar.	Sidereal.
3 50 00	3 50 37.7831	3 55 00	3 55 38.6045
10	47.8105	10	48.6319
20	57.8379	20	58.6593
30	3 51 07.8653	30	3 56 08.6867
40	17.8927	40	18.7140
50	27.9200	50	28.7414
3 51 00	37.9474	3 56 00	38.7688
10	47.9748	10	48.7962
20	58.0022	20	58.8236
30	3 52 08.0296	30	3 57 08.8509
40	18.0569	40	18.8783
50	28.0843	50	28.9057
3 52 00	38.1117	3 57 00	38.9331
10	48.1391	10	48.9604
20	58.1665	20	58.9878
30	3 53 08.1938	30	3 58 09.0152
40	18.2212	40	19.0426
50	28.2486	50	29.0700
3 53 00	38.2760	3 58 00	39.0973
10	48.3033	10	49.1247
20	58.3307	20	59.1521
30	3 54 08.3581	30	3 59 09.1795
40	18.3855	40	19.2069
50	28.4129	50	29.2342
3 54 00	38.4402	3 59 00	39.2616
10	48.4676	10	49.2890
20	58.4950	20	59.3164
30	3 55 08.5224	30	4 00 09.3438
40	18.5498	40	19.3711
50	28.5771	50	29.3985

Sidereal.	Solar.	Sidereal.	Solar.
3 50 00	3 49 22.3200	3 55 00	3 54 21.5009
10	32.2927	10	31.4736
20	42.2654	20	41.4463
30	52.2381	30	51.4190
40	3 50 02.2108	40	3 55 01.3917
50	12.1835	50	11.3644
3 51 00	22.1562	3 56 00	21.3371
10	32.1289	10	31.3098
20	42.1016	20	41.2825
30	52.0743	30	51.2551
40	3 51 02.0470	40	3 56 01.2278
50	12.0197	50	11.2005
3 52 00	21.9924	3 57 00	21.1732
10	31.9651	10	31.1459
20	41.9378	20	41.1186
30	51.9105	30	51.0913
40	3 52 01.8831	40	3 57 01.0640
50	11.8558	50	11.0367
3 53 00	21.8285	3 58 00	21.0094
10	31.8012	10	30.9821
20	41.7739	20	40.9548
30	51.7466	30	50.9275
40	3 53 01.7193	40	3 58 00.9002
50	11.6920	50	10.8729
3 54 00	21.6647	3 59 00	20.8456
10	31.6374	10	30.8183
20	41.6101	20	40.7910
30	51.5828	30	50.7637
40	3 54 01.5555	40	3 59 00.7364
50	11.5282	50	10.7091

Solar.	Sidereal.	Solar.	Sidereal.
4 00 00	4 00 39.4259	4 05 00	4 05 40.2473
10	49.4533	10	50.2746
20	59.4806	20	4 06 00.3020
30	4 01 09.5080	30	10.3294
40	19.5354	40	20.3568
50	29.5628	50	30.3842
4 01 00	39.5902	4 06 00	40.4115
10	49.6175	10	50.4389
20	59.6449	20	4 07 00.4663
30	4 02 09.6723	30	10.4937
40	19.6997	40	20.5211
50	29.7271	50	30.5484
4 02 00	39.7544	4 07 00	40.5758
10	49.7818	10	50.6032
20	59.8092	20	4 08 00.6306
30	4 03 09.8366	30	10.6580
40	19.8640	40	20.6853
50	29.8913	50	30.7127
4 03 00	39.9187	4 08 00	40.7401
10	49.9461	10	50.7675
20	59.9735	20	4 09 00.7948
30	4 04 10.0009	30	10.8222
40	20.0282	40	20.8496
50	30.0556	50	30.8770
4 04 00	40.0830	4 09 00	40.9044
10	50.1104	10	50.9317
20	4 05 00.1377	20	4 10 00.9591
30	10.1651	30	10.9865
40	20.1925	40	21.0139
50	30.2199	50	31.0413

Sidereal.	Solar.	Sidereal.	Solar.
4 00 00	3 59 20.6818	4 05 00	4 04 19.8626
10	30.6545	10	29.8353
20	40.6271	20	39.8080
30	50.5998	30	49.7807
40	4 00 00.5725	40	59.7534
50	10.5452	50	4 05 09.7261
4 01 00	20.5179	4 06 00	19.6988
10	30.4906	10	29.6715
20	40.4633	20	39.6442
30	50.4360	30	49.6169
40	4 01 00.4087	40	59.5896
50	10.3814	50	4 06 09.5623
4 02 00	20.3541	4 07 00	19.5350
10	30.3268	10	29.5077
20	40.2995	20	39.4804
30	50.2722	30	49.4531
40	4 02 00.2449	40	59.4258
50	10.2176	50	4 07 09.3985
4 03 00	20.1903	4 08 00	19.3712
10	30.1630	10	29.3438
20	40.1357	20	39.3165
30	50.1084	30	49.2892
40	4 03 00.0811	40	59.2619
50	10.0538	50	4 08 09.2346
4 04 00	20.0265	4 09 00	19.2073
10	29.9991	10	29.1800
20	39.9718	20	39.1527
30	49.9445	30	49.1254
40	59.9172	40	59.0981
50	4 04 09.8899	50	4 09 09.0708

Solar.	Sidereal.	Solar.	Sidereal.
4 10 00	41.0686	4 15 00	41.8900
10	51.0960	10	51.9174
20	4 11 01.1234	20	4 16 01.9448
30	11.1508	30	11.9721
40	21.1782	40	21.9995
50	31.2055	50	32.0269
4 11 00	41.2329	4 16 00	42.0543
10	51.2603	10	52.0817
20	4 12 01.2877	20	4 17 02.1090
30	11.3150	30	12.1364
40	21.3424	40	22.1638
50	31.3698	50	32.1912
4 12 00	41.3972	4 17 00	42.2186
10	51.4246	10	52.2459
20	4 13 01.4519	20	4 18 02.2733
30	11.4793	30	12.3007
40	21.5067	40	22.3281
50	31.5341	50	32.3555
4 13 00	41.5615	4 18 00	42.3828
10	51.5888	10	52.4102
20	4 14 01.6162	20	4 19 02.4376
30	11.6436	30	12.4650
40	21.6710	40	22.4923
50	31.6984	50	32.5197
4 14 00	41.7257	4 19 00	42.5471
10	51.7531	10	52.5745
20	4 15 01.7805	20	4 20 02.6019
30	11.8079	30	12.6292
40	21.8353	40	22.6566
50	31.8626	50	32.6840



Sidereal.	Solar.	Sidereal.	Solar.
4 10 00	4 09 19.0435	4 15 00	4 14 18.2244
10	29.0162	10	28.1971
20	38.9889	20	38.1698
30	48.9616	30	48.1425
40	58.9343	40	58.1152
50	4 10 08.9070	50	4 15 08.0878
4 11 00	18.8797	4 16 00	18.0605
10	28.8524	10	28.0332
20	38.8251	20	38.0059
30	48.7978	30	47.9786
40	58.7705	40	57.9513
50	4 11 08.7432	50	4 16 07.9240
4 12 00	18.7158	4 17 00	17.8967
10	28.6885	10	27.8694
20	38.6612	20	37.8421
30	48.6339	30	47.8148
40	58.6066	40	57.7875
50	4 12 08.5793	50	4 17 07.7602
4 13 00	18.5520	4 18 00	17.7329
10	28.5247	10	27.7056
20	38.4974	20	37.6783
30	48.4701	30	47.6510
40	58.4428	40	57.6237
50	4 13 08.4155	50	4 18 07.5964
4 14 00	18.3882	4 19 00	17.5691
10	28.3609	10	27.5418
20	38.3336	20	37.5145
30	48.3063	30	47.4872
40	58.2790	40	57.4598
50	4 14 08.2517	50	4 19 07.4325

Solar.	Sidereal.	Solar.	Sidereal.
4 20 00	4 20 42.7114	4 25 00	4 25 43.5328
10	52.7388	10	53.5601
20	4 21 02.7661	20	4 26 03.5875
30	12.7935	30	13.6149
40	22.8209	40	23.6423
50	32.8483	50	33.6697
4 21 00	42.8757	4 26 00	43.6970
10	52.9030	10	53.7244
20	4 22 02.9304	20	4 27 03.7518
30	12.9578	30	13.7792
40	22.9852	40	23.8065
50	33.0126	50	33.8339
4 22 00	43.0399	4 27 00	43.8613
10	53.0673	10	53.8887
20	4 23 03.0947	20	4 28 03.9161
30	13.1221	30	13.9434
40	23.1494	40	23.9708
50	33.1768	50	33.9982
4 23 00	43.2042	4 28 00	44.0256
10	53.2316	10	54.0530
20	4 24 03.2590	20	4 29 04.0803
30	13.2863	30	14.1077
40	23.3137	40	24.1351
50	33.3411	50	34.1625
4 24 00	43.3685	4 29 00	44.1899
10	53.3959	10	54.2172
20	4 25 03.4232	20	4 30 04.2446
30	13.4506	30	14.2720
40	23.4780	40	24.2994
50	33.5054	50	34.3267

Sidereal.	Solar.	Sidereal.	Solar.
4 20 00	4 19 17.4052	4 25 00	4 24 16.5861
10	27.3779	10	26.5588
20	37.3506	20	36.5315
30	47.3233	30	46.5042
40	57.2960	40	56.4769
50	4 20 07.2687	50	4 25 06.4496
4 21 00	17.2414	4 26 00	16.4223
10	27.2141	10	26.3950
20	37.1868	20	36.3677
30	47.1595	30	46.3404
40	57.1322	40	56.3131
50	4 21 07.1049	50	4 26 06.2858
4 22 00	17.0776	4 27 00	16.2585
10	27.0503	10	26.2312
20	37.0230	20	36.2038
30	46.9957	30	46.1765
40	56.9684	40	56.1492
50	4 22 06.9411	50	4 27 06.1219
4 23 00	16.9138	4 28 00	16.0946
10	26.8865	10	26.0673
20	36.8592	20	36.0400
30	46.8318	30	46.0127
40	56.8045	40	55.9854
50	4 23 06.7772	50	4 28 05.9581
4 24 00	16.7499	4 29 00	15.9308
10	26.7226	10	25.9035
20	36.6953	20	35.8762
30	46.6680	30	45.8489
40	56.6407	40	55.8216
50	4 24 06.6134	50	4 29 05.7943

Solar.	Sidereal.	Solar.	Sidereal.
4 30 00	4 30 44.3541	4 35 00	4 35 45.1755
10	54.3815	10	55.2029
20	4 31 04.4089	20	4 36 05.2303
30	14.4363	30	15.2576
40	24.4636	40	25.2850
50	34.4910	50	35.3124
4 31 00	44.5184	4 36 00	45.3398
10	54.5458	10	55.3672
20	4 32 04.5732	20	4 37 05.3945
30	14.6005	30	15.4219
40	24.6279	40	25.4493
50	34.6553	50	35.4767
4 32 00	44.6827	4 37 00	45.5040
10	54.7101	10	55.5314
20	4 33 04.7374	20	4 38 05.5588
30	14.7648	30	15.5862
40	24.7922	40	25.6136
50	34.8196	50	35.6409
4 33 00	44.8470	4 38 00	45.6683
10	54.8743	10	55.6957
20	4 34 04.9017	20	4 39 05.7231
30	14.9291	30	15.7505
40	24.9565	40	25.7778
50	34.9838	50	35.8052
4 34 00	45.0112	4 39 00	45.8326
10	55.0386	10	55.8600
20	4 35 05.0660	20	4 40 05.8874
30	15.0934	30	15.9147
40	25.1207	40	25.9421
50	35.1481	50	35.9695

Sidereal.	Solar.	Sidereal.	Solar.
4 30 00	4 29 15.7670	4 35 00	4 34 14.9478
10	25.7397	10	24.9205
20	35.7124	20	34.8932
30	45.6851	30	44.8659
40	55.6578	40	54.8386
50	4 30 05.6305	50	4 35 04.8113
4 31 00	15.6032	4 36 00	14.7840
10	25.5758	10	24.7567
20	35.5485	20	34.7294
30	45.5212	30	44.7021
40	55.4939	40	54.6748
50	4 31 05.4666	50	4 36 04.6475
4 32 00	15.4393	4 37 00	14.6202
10	25.4120	10	24.5929
20	35.3847	20	34.5656
30	45.3574	30	44.5383
40	55.3301	40	54.5110
50	4 32 05.3028	50	4 37 04.4837
4 33 00	15.2755	4 38 00	14.4564
10	25.2482	10	24.4291
20	35.2209	20	34.4018
30	45.1936	30	44.3745
40	55.1663	40	54.3472
50	4 33 05.1390	50	4 38 04.3198
4 34 00	15.1117	4 39 00	14.2925
10	25.0844	10	24.2652
20	35.0571	20	34.2379
30	45.0298	30	44.2106
40	55.0025	40	54.1833
50	4 34 04.9752	50	4 39 04.1560

Solar.	Sidereal.	Solar.	Sidereal.
4 40 00	4 40 45.9969	4 45 00	4 45 46.8182
10	56.0243	10	56.8456
20	4 41 06.0516	20	4 46 06.8730
30	16.0790	30	16.9004
40	26.1064	40	26.9278
50	36.1338	50	36.9551
4 41 00	46.1611	4 46 00	46.9825
10	56.1885	10	57.0099
20	4 42 06.2159	20	4 47 07.0373
30	16.2433	30	17.0647
40	26.2707	40	27.0920
50	36.2980	50	37.1194
4 42 00	46.3254	4 47 00	47.1468
10	56.3528	10	57.1742
20	4 43 06.3802	20	4 48 07.2016
30	16.4076	30	17.2289
40	26.4349	40	27.2563
50	36.4623	50	37.2837
4 43 00	46.4897	4 48 00	47.3111
10	56.5171	10	57.3384
20	4 44 06.5445	20	4 49 07.3658
30	16.5718	30	17.3932
40	26.5992	40	27.4206
50	36.6266	50	37.4480
4 44 00	46.6540	4 49 00	47.4753
10	56.6814	10	57.5027
20	4 45 06.7087	20	4 50 07.5301
30	16.7361	30	17.5575
40	26.7635	40	27.5849
50	36.7909	50	37.6122

Sidereal.	Solar.	Sidereal.	Solar.
4 40 00	4 39 14.1287	4 45 00	4 44 13.3096
10	24.1014	10	23.2823
20	34.0741	20	33.2550
30	44.0468	30	43.2277
40	54.0195	40	53.2004
50	4 40 03.9922	50	4 45 03.1731
4 41 00	13.9649	4 46 00	13.1458
10	23.9376	10	23.1185
20	33.9103	20	33.0912
30	43.8830	30	43.0638
40	53.8557	40	53.0365
50	4 41 03.8284	50	4 46 03.0092
4 42 00	13.8011	4 47 00	12.9819
10	23.7738	10	22.9546
20	33.7465	20	32.9273
30	43.7192	30	42.9000
40	53.6918	40	52.8727
50	4 42 03.6645	50	4 47 02.8454
4 43 00	13.6372	4 48 00	12.8181
10	23.6099	10	22.7908
20	33.5826	20	32.7635
30	43.5553	30	42.7362
40	53.5280	40	52.7089
50	4 43 03.5007	50	4 48 02.6816
4 44 00	13.4734	4 49 00	12.6543
10	23.4461	10	22.6270
20	33.4188	20	32.5997
30	43.3915	30	42.5724
40	53.3642	40	52.5451
50	4 44 03.3369	50	4 49 02.5178

Solar.	Sidereal.	Solar.	Sidereal.
4 50 00	4 50 47.6396	4 55 00	4 55 48.4610
10	57.6670	10	58.4884
20	4 51 07.6944	20	4 56 08.5157
30	17.7218	30	18.5431
40	27.7491	40	28.5705
50	37.7765	50	38.5979
4 51 00	47.8039	4 56 00	48.6253
10	57.8313	10	58.6526
20	4 52 07.8587	20	4 57 08.6800
30	17.8860	30	18.7074
40	27.9134	40	28.7348
50	37.9408	50	38.7622
4 52 00	47.9682	4 57 00	48.7895
10	57.9955	10	58.8169
20	4 53 08.0229	20	4 58 08.8443
30	18.0503	30	18.8717
40	28.0777	40	28.8991
50	38.1051	50	38.9264
4 53 00	48.1324	4 58 00	48.9538
10	58.1598	10	58.9812
20	4 54 08.1872	20	4 59 09.0086
30	18.2146	30	19.0360
40	28.2420	40	29.0633
50	38.2693	50	39.0907
4 54 00	48.2967	4 59 00	49.1181
10	58.3241	10	59.1455
20	4 55 08.3515	20	5 00 09.1728
30	18.3789	30	19.2002
40	28.4062	40	29.2276
50	38.4336	50	39.2550



Sidereal.	Solar.	Sidereal.	Solar.
4 50 00	4 49 12.4905	4 55 00	4 54 11.6713
10	22.4632	10	21.6440
20	32.4358	20	31.6167
30	42.4085	30	41.5894
40	52.3812	40	51.5621
50	4 50 02.3539	50	4 55 01.5348
4 51 00	12.3266	4 56 00	11.5075
10	22.2993	10	21.4802
20	32.2720	20	31.4529
30	42.2447	30	41.4256
40	52.2174	40	51.3983
50	4 51 02.1901	50	4 56 01.3710
4 52 00	12.1628	4 57 00	11.3437
10	22.1355	10	21.3164
20	32.1082	20	31.2891
30	42.0809	30	41.2618
40	52.0536	40	51.2345
50	4 52 02.0263	50	4 57 01.2072
4 53 00	11.9990	4 58 00	11.1798
10	21.9717	10	21.1525
20	31.9444	20	31.1252
30	41.9171	30	41.0979
40	51.8898	40	51.0706
50	4 53 01.8625	50	4 58 01.0433
4 54 00	11.8352	4 59 00	11.0160
10	21.8078	10	20.9887
20	31.7805	20	30.9614
30	41.7532	30	40.9341
40	51.7259	40	50.9068
50	4 54 01.6986	50	4 59 00.8795

Solar.	Sidereal.	Solar.	Sidereal.
5 00 00	5 00 49.2824	5 05 00	5 05 50.1037
10	59.3097	10	5 06 00.1311
20	5 01 09.3371	20	10.1585
30	19.3645	30	20.1859
40	29.3919	40	30.2133
50	39.4193	50	40.2406
5 01 00	49.4466	5 06 00	50.2680
10	59.4740	10	5 07 00.2954
20	5 02 09.5014	20	10.3228
30	19.5288	30	20.3501
40	29.5562	40	30.3775
50	39.5835	50	40.4049
5 02 00	49.6109	5 07 00	50.4323
10	59.6383	10	5 08 00.4597
20	5 03 09.6657	20	10.4870
30	19.6931	30	20.5144
40	29.7204	40	30.5418
50	39.7478	50	40.5692
5 03 00	49.7752	5 08 00	50.5966
10	59.8026	10	5 09 00.6239
20	5 04 09.8299	20	10.6513
30	19.8573	30	20.6787
40	29.8847	40	30.7061
50	39.9121	50	40.7335
5 04 00	49.9395	5 09 00	50.7608
10	59.9668	10	5 10 00.7882
20	5 05 09.9942	20	10.8156
30	20.0216	30	20.8430
40	30.0490	40	30.8704
50	40.0764	50	40.8977

Sidereal.	Solar.	Sidereal.	Solar.
5 00 00	4 59 10.8522	5 05 00	5 04 10.0331
10	20.8249	10	20.0058
20	30.7976	20	29.9785
30	40.7703	30	39.9512
40	50.7430	40	49.9239
50	5 00 00.7157	50	59.8965
5 01 00	10.6884	5 06 00	5 05 09.8692
10	20.6611	10	19.8419
20	30.6338	20	29.8146
30	40.6065	30	39.7873
40	50.5792	40	49.7600
50	5 01 00.5519	50	59.7327
5 02 00	10.5245	5 07 00	5 06 09.7054
10	20.4972	10	19.6781
20	30.4699	20	29.6508
30	40.4426	30	39.6235
40	50.4153	40	49.5962
50	5 02 00.3880	50	59.5689
5 03 00	10.3607	5 08 00	5 07 09.5416
10	20.3334	10	19.5143
20	30.3061	20	29.4870
30	40.2788	30	39.4597
40	50.2515	40	49.4324
50	5 03 00.2242	50	59.4051
5 04 00	10.1969	5 09 00	5 08 09.3778
10	20.1696	10	19.3505
20	30.1423	20	29.3232
30	40.1150	30	39.2959
40	50.0877	40	49.2685
50	5 04 00.0604	50	59.2412

Solar.	Sidereal.	Solar.	Sidereal.
5 10 00	5 10 50.9251	5 15 00	5 15 51.7465
10	5 11 00.9525	10	5 16 01.7739
20	10.9799	20	11.8012
30	21.0072	30	21.8286
40	31.0346	40	31.8560
50	41.0620	50	41.8834
5 11 00	51.0894	5 16 00	51.9108
10	5 12 01.1168	10	5 17 01.9381
20	11.1441	20	11.9655
30	21.1715	30	21.9929
40	31.1989	40	32.0203
50	41.2263	50	42.0477
5 12 00	51.2537	5 17 00	52.0750
10	5 13 01.2810	10	5 18 02.1024
20	11.3084	20	12.1298
30	21.3358	30	22.1572
40	31.3632	40	32.1845
50	41.3906	50	42.2119
5 13 00	51.4179	5 18 00	52.2393
10	5 14 01.4453	10	5 19 02.2667
20	11.4727	20	12.2941
30	21.5001	30	22.3214
40	31.5274	40	32.3488
50	41.5548	50	42.3762
5 14 00	51.5822	5 19 00	52.4036
10	5 15 01.6096	10	5 20 02.4310
20	11.6370	20	12.4583
30	21.6643	30	22.4857
40	31.6917	40	32.5131
50	41.7191	50	42.5405

Sidereal.	Solar.	Sidereal.	Solar.
5 10 00	5 09 09.2139	5 15 00	5 14 08.3948
10	19.1866	10	18.3675
20	29.1593	20	28.3402
30	39.1320	30	38.3129
40	49.1047	40	48.2856
50	59.0774	50	58.2583
5 11 00	5 10 09.0501	5 16 00	5 15 08.2310
10	19.0228	10	18.2037
20	28.9955	20	28.1764
30	38.9682	30	38.1491
40	48.9409	40	48.1218
50	58.9136	50	58.0945
5 12 00	5 11 08.8863	5 17 00	5 16 08.0672
10	18.8590	10	18.0399
20	28.8317	20	28.0125
30	38.8044	30	37.9852
40	48.7771	40	47.9579
50	58.7498	50	57.9306
5 13 00	5 12 08.7225	5 18 00	5 17 07.9033
10	18.6952	10	17.8760
20	28.6679	20	27.8487
30	38.6405	30	37.8214
40	48.6132	40	47.7941
50	58.5859	50	57.7668
5 14 00	5 13 08.5586	5 19 00	5 18 07.7395
10	18.5313	10	17.7122
20	28.5040	20	27.6849
30	38.4767	30	37.6576
40	48.4494	40	47.6303
50	58.4221	50	57.6030

Solar.	Sidereal.	Solar.	Sidereal.
5 20 00	5 20 52.5679	5 25 00	5 25 53.3892
10	5 21 02.5952	10	5 26 03.4166
20	12.6226	20	13.4440
30	22.6500	30	23.4714
40	32.6774	40	33.4987
50	42.7048	50	43.5261
5 21 00	52.7321	5 26 00	53.5535
10	5 22 02.7595	10	5 27 03.5809
20	12.7869	20	13.6083
30	22.8143	30	23.6356
40	32.8416	40	33.6630
50	42.8690	50	43.6904
5 22 00	52.8964	5 27 00	53.7178
10	5 23 02.9238	10	5 28 03.7452
20	12.9512	20	13.7725
30	22.9785	30	23.7999
40	33.0059	40	33.8273
50	43.0333	50	43.8547
5 23 00	53.0607	5 28 00	53.8821
10	5 24 03.0881	10	5 29 03.9094
20	13.1154	20	13.9368
30	23.1428	30	23.9642
40	33.1702	40	33.9916
50	43.1976	50	44.0189
5 24 00	53.2250	5 29 00	54.0463
10	5 25 03.2523	10	5 30 04.0737
20	13.2797	20	14.1011
30	23.3071	30	24.1285
40	33.3345	40	34.1558
50	43.3618	50	44.1832

Sidereal.	Solar.	Sidereal.	Solar.
5 20 00	5 19 07.5757	5 25 00	5 24 06.7565
10	17.5484	10	16.7292
20	27.5211	20	26.7019
30	37.4938	30	36.6746
40	47.4665	40	46.6473
50	57.4392	50	56.6200
5 21 00	5 20 07.4119	5 26 00	5 25 06.5927
10	17.3845	10	16.5654
20	27.3572	20	26.5381
30	37.3299	30	36.5108
40	47.3026	40	46.4835
50	57.2753	50	56.4562
5 22 00	5 21 07.2480	5 27 00	5 26 06.4289
10	17.2207	10	16.4016
20	27.1934	20	26.3743
30	37.1661	30	36.3470
40	47.1388	40	46.3197
50	57.1115	50	56.2924
5 23 00	5 22 07.0842	5 28 00	5 27 06.2651
10	17.0569	10	16.2378
20	27.0296	20	26.2105
30	37.0023	30	36.1832
40	46.9750	40	46.1559
50	56.9477	50	56.1285
5 24 00	5 23 06.9204	5 29 00	5 28 06.1012
10	16.8931	10	16.0739
20	26.8658	20	26.0466
30	36.8385	30	36.0193
40	46.8112	40	45.9920
50	56.7839	50	55.9647

Solar.	Sidereal.	Solar.	Sidereal.
5 30 00	5 30 54.2106	5 35 00	5 35 55.0320
10	5 31 04.2380	10	5 36 05.0594
20	14.2654	20	15.0867
30	24.2927	30	25.1141
40	34.3201	40	35.1415
50	44.3475	50	45.1689
5 31 00	54.3749	5 36 00	55.1962
10	5 32 04.4023	10	5 37 05.2236
20	14.4296	20	15.2510
30	24.4570	30	25.2784
40	34.4844	40	35.3058
50	44.5118	50	45.3331
5 32 00	54.5391	5 37 00	55.3605
10	5 33 04.5665	10	5 38 05.3879
20	14.5939	20	15.4153
30	24.6213	30	25.4427
40	34.6487	40	35.4700
50	44.6760	50	45.4974
5 33 00	54.7034	5 38 00	55.5248
10	5 34 04.7308	10	5 39 05.5522
20	14.7582	20	15.5796
30	24.7856	30	25.6069
40	34.8129	40	35.6343
50	44.8403	50	45.6617
5 34 00	54.8677	5 39 00	55.6891
10	5 35 04.8951	10	5 40 05.7165
20	14.9225	20	15.7438
30	24.9498	30	25.7712
40	34.9772	40	35.7986
50	45.0046	50	45.8260



Sidereal.	Solar.	Sidereal.	Solar.
5 30 00	5 29 05.9374	5 35 00	5 34 05.1183
10	15.9101	10	15.0910
20	25.8828	20	25.0637
30	35.8555	30	35.0364
40	45.8282	40	45.0091
50	55.8009	50	54.9818
5 31 00	5 30 05.7736	5 36 00	5 35 04.9545
10	15.7463	10	14.9272
20	25.7190	20	24.8999
30	35.6917	30	34.8725
40	45.6644	40	44.8452
50	55.6371	50	54.8179
5 32 00	5 31 05.6098	5 37 00	5 36 04.7906
10	15.5825	10	14.7633
20	25.5552	20	24.7360
30	35.5279	30	34.7087
40	45.5005	40	44.6814
50	55.4732	50	54.6541
5 33 00	5 32 05.4459	5 38 00	5 37 04.6268
10	15.4186	10	14.5995
20	25.3913	20	24.5722
30	35.3640	30	34.5449
40	45.3367	40	44.5176
50	55.3094	50	54.4903
5 34 00	5 33 05.2821	5 39 00	5 38 04.4630
10	15.2548	10	14.4357
20	25.2275	20	24.4084
30	35.2002	30	34.3811
40	45.1729	40	44.3538
50	55.1456	50	54.3265

Solar.	Sidereal.	Solar.	Sidereal.
5 40 00	5 40 55.8533	5 45 00	5 45 56.6747
10	5 41 05.8807	10	5 46 06.7021
20	15.9081	20	16.7295
30	25.9355	30	26.7569
40	35.9629	40	36.7842
50	45.9902	50	46.8116
5 41 00	56.0176	5 46 00	56.8390
10	5 42 06.0450	10	5 47 06.8664
20	16.0724	20	16.8938
30	26.0998	30	26.9211
40	36.1271	40	36.9485
50	46.1545	50	46.9759
5 42 00	56.1819	5 47 00	57.0033
10	5 43 06.2093	10	5 48 07.0306
20	16.2367	20	17.0580
30	26.2640	30	27.0854
40	36.2914	40	37.1128
50	46.3188	50	47.1402
5 43 00	56.3462	5 48 00	57.1675
10	5 44 06.3735	10	5 49 07.1949
20	16.4009	20	17.2223
30	26.4283	30	27.2497
40	36.4557	40	37.2771
50	46.4831	50	47.3044
5 44 00	56.5104	5 49 00	57.3318
10	5 45 06.5378	10	5 50 07.3592
20	16.5652	20	17.3866
30	26.5926	30	27.4140
40	36.6200	40	37.4413
50	46.6473	50	47.4687

Sidereal.	Solar.	Sidereal.	Solar.
5 40 00	5 39 04.2992	5 45 00	5 44 03.4800
10	14.2719	10	13.4527
20	24.2445	20	23.4254
30	34.2172	30	33.3981
40	44.1899	40	43.3708
50	54.1626	50	53.3435
5 41 00	5 40 04.1353	5 46 00	5 45 03.3162
10	14.1080	10	13.2889
20	24.0807	20	23.2616
30	34.0534	30	33.2343
40	44.0261	40	43.2070
50	53.9988	50	53.1797
5 42 00	5 41 03.9715	5 47 00	5 46 03.1524
10	13.9442	10	13.1251
20	23.9169	20	23.0978
30	33.8896	30	33.0705
40	43.8623	40	43.0432
50	53.8350	50	53.0159
5 43 00	5 42 03.8077	5 48 00	5 47 02.9885
10	13.7804	10	12.9612
20	23.7531	20	22.9339
30	33.7258	30	32.9066
40	43.6985	40	42.8793
50	53.6712	50	52.8520
5 44 00	5 43 03.6439	5 49 00	5 48 02.8247
10	13.6165	10	12.7974
20	23.5892	20	22.7701
30	33.5619	30	32.7428
40	43.5346	40	42.7155
50	53.5073	50	52.6882

Solar.	Sidereal.	Solar.	Sidereal.
5 50 00	5 50 57.4961	5 55 00	5 55 58.3175
10	5 51 07.5235	10	5 56 08.3448
20	17.5508	20	18.3722
30	27.5782	30	28.3996
40	37.6056	40	38.4270
50	47.6330	50	48.4544
5 51 00	57.6604	5 56 00	58.4817
10	5 52 07.6877	10	5 57 08.5091
20	17.7151	20	18.5365
30	27.7425	30	28.5639
40	37.7699	40	38.5913
50	47.7973	50	48.6186
5 52 00	57.8246	5 57 00	58.6460
10	5 53 07.8520	10	5 58 08.6734
20	17.8794	20	18.7008
30	27.9068	30	28.7282
40	37.9342	40	38.7555
50	47.9615	50	48.7829
5 53 00	57.9889	5 58 00	58.8103
10	5 54 08.0163	10	5 59 08.8377
20	18.0437	20	18.8650
30	28.0711	30	28.8924
40	38.0984	40	38.9198
50	48.1258	50	48.9472
5 54 00	58.1532	5 59 00	58.9746
10	5 55 08.1806	10	6 00 09.0019
20	18.2079	20	19.0293
30	28.2353	30	29.0567
40	38.2627	40	39.0841
50	48.2901	50	49.1115

Sidereal.	Solar.	Sidereal.	Solar.
5 50 00	5 49 02.6609	5 55 00	5 54 01.8418
10	12.6336	10	11.8145
20	22.6063	20	21.7872
30	32.5790	30	31.7599
40	42.5517	40	41.7326
50	52.5244	50	51.7052
5 51 00	5 50 02.4971	5 56 00	5 55 01.6779
10	12.4698	10	11.6506
20	22.4425	20	21.6233
30	32.4152	30	31.5960
40	42.3879	40	41.5687
50	52.3605	50	51.5414
5 52 00	5 51 02.3332	5 57 00	5 56 01.5141
10	12.3059	10	11.4868
20	22.2786	20	21.4595
30	32.2513	30	31.4322
40	42.2240	40	41.4049
50	52.1967	50	51.3776
5 53 00	5 52 02.1694	5 58 00	5 57 01.3503
10	12.1421	10	11.3230
20	22.1148	20	21.2957
30	32.0875	30	31.2684
40	42.0602	40	41.2411
50	52.0329	50	51.2138
5 54 00	5 53 02.0056	5 59 00	5 58 01.1865
10	11.9783	10	11.1592
20	21.9510	20	21.1319
30	31.9237	30	31.1046
40	41.8964	40	41.0772
50	51.8691	50	51.0499

Solar.	Sidereal.	Solar.	Sidereal.
6 00 00	6 00 59.1388	6 05 00	6 05 59.9602
10	6 01 09.1662	10	6 06 09.9876
20	19.1936	20	20.0150
30	29.2210	30	30.0423
40	39.2484	40	40.0697
50	49.2757	50	50.0971
6 01 00	59.3031	6 06 00	6 07 00.1245
10	6 02 09.3305	10	10.1519
20	19.3579	20	20.1792
30	29.3852	30	30.2066
40	39.4126	40	40.2340
50	49.4400	50	50.2614
6 02 00	59.4674	6 07 00	6 08 00.2888
10	6 03 09.4948	10	10.3161
20	19.5221	20	20.3435
30	29.5495	30	30.3709
40	39.5769	40	40.3983
50	49.6043	50	50.4257
6 03 00	59.6317	6 08 00	6 09 00.4530
10	6 04 09.6590	10	10.4804
20	19.6864	20	20.5078
30	29.7138	30	30.5352
40	39.7412	40	40.5625
50	49.7686	50	50.5899
6 04 00	59.7959	6 09 00	6 10 00.6173
10	6 05 09.8233	10	10.6447
20	19.8507	20	20.6721
30	29.8781	30	30.6994
40	39.9055	40	40.7268
50	49.9328	50	50.7542

Sidereal.	Solar.	Sidereal.	Solar.
6 00 00	5 59 01.0226	6 05 00	6 04 00.2035
10	10.9953	10	10.1762
20	20.9680	20	20.1489
30	30.9407	30	30.1216
40	40.9134	40	40.0943
50	50.8861	50	50.0670
6 01 00	6 00 00.8588	6 06 00	6 05 00.0397
10	10.8315	10	10.0124
20	20.8042	20	19.9851
30	30.7769	30	29.9578
40	40.7496	40	39.9305
50	50.7223	50	49.9032
6 02 00	6 01 00.6950	6 07 00	59.8759
10	10.6677	10	6 06 09.8486
20	20.6404	20	19.8212
30	30.6131	30	29.7939
40	40.5858	40	39.7666
50	50.5585	50	49.7393
6 03 00	6 02 00.5312	6 08 00	59.7120
10	10.5039	10	6 07 09.6847
20	20.4766	20	19.6574
30	30.4492	30	29.6301
40	40.4219	40	39.6028
50	50.3946	50	49.5755
6 04 00	6 03 00.3673	6 09 00	59.5482
10	10.3400	10	6 08 09.5209
20	20.3127	20	19.4936
30	30.2854	30	29.4663
40	40.2581	40	39.4390
50	50.2308	50	49.4117

Solar.	Sidereal.	Solar.	Sidereal.
6 10 00	6 11 00.7816	6 15 00	6 16 01.6030
10	10.8090	10	11.6303
20	20.8363	20	21.6577
30	30.8637	30	31.6851
40	40.8911	40	41.7125
50	50.9185	50	51.7399
6 11 00	6 12 00.9459	6 16 00	6 17 01.7672
10	10.9732	10	11.7946
20	21.0006	20	21.8220
30	31.0280	30	31.8494
40	41.0554	40	41.8767
50	51.0828	50	51.9041
6 12 00	6 13 01.1101	6 17 00	6 18 01.9315
10	11.1375	10	11.9589
20	21.1649	20	21.9863
30	31.1923	30	32.0136
40	41.2196	40	42.0410
50	51.2470	50	52.0684
6 13 00	6 14 01.2744	6 18 00	6 19 02.0958
10	11.3018	10	12.1232
20	21.3292	20	22.1505
30	31.3565	30	32.1779
40	41.3839	40	42.2053
50	51.4113	50	52.2327
6 14 00	6 15 01.4387	6 19 00	6 20 02.2601
10	11.4661	10	12.2874
20	21.4934	20	22.3148
30	31.5208	30	32.3422
40	41.5482	40	42.3696
50	51.5756	50	52.3969



Sidereal.	Solar.	Sidereal.	Solar.
6 10 00	6 08 59.3844	6 15 00	6 13 58.5652
10	6 09 09.3571	10	6 14 08.5379
20	19.3298	20	18.5106
30	29.3025	30	28.4833
40	39.2752	40	38.4560
50	49.2479	50	48.4287
6 11 00	59.2206	6 16 00	58.4014
10	6 10 09.1932	10	6 15 08.3741
20	19.1659	20	18.3468
30	29.1386	30	28.3195
40	39.1113	40	38.2922
50	49.0840	50	48.2649
6 12 00	59.0567	6 17 00	58.2376
10	6 11 09.0294	10	6 16 08.2103
20	19.0021	20	18.1830
30	28.9748	30	28.1557
40	38.9475	40	38.1284
50	48.9202	50	48.1011
6 13 00	58.8929	6 18 00	58.0738
10	6 12 08.8656	10	6 17 08.0465
20	18.8383	20	18.0192
30	28.8110	30	27.9919
40	38.7837	40	37.9646
50	48.7564	50	47.9372
6 14 00	58.7291	6 19 00	57.9099
10	6 13 08.7018	10	6 18 07.8826
20	18.6745	20	17.8553
30	28.6472	30	27.8280
40	38.6199	40	37.8007
50	48.5926	50	47.7734

Solar.	Sidereal.	Solar.	Sidereal.
6 20 00	6 21 02.4243	6 25 00	6 26 03.2457
10	12.4517	10	13.2731
20	22.4791	20	23.3005
30	32.5065	30	33.3278
40	42.5338	40	43.3552
50	52.5612	50	53.3826
6 21 00	6 22 02.5886	6 26 00	6 27 03.4100
10	12.6160	10	13.4374
20	22.6434	20	23.4647
30	32.6707	30	33.4921
40	42.6981	40	43.5195
50	52.7255	50	53.5469
6 22 00	6 23 02.7529	6 27 00	6 28 03.5742
10	12.7803	10	13.6016
20	22.8076	20	23.6290
30	32.8350	30	33.6564
40	42.8624	40	43.6838
50	52.8898	50	53.7111
6 23 00	6 24 02.9172	6 28 00	6 29 03.7385
10	12.9445	10	13.7659
20	22.9719	20	23.7933
30	32.9993	30	33.8207
40	43.0267	40	43.8480
50	53.0540	50	53.8754
6 24 00	6 25 03.0814	6 29 00	6 30 03.9028
10	13.1088	10	13.9302
20	23.1362	20	23.9576
30	33.1636	30	33.9849
40	43.1909	40	44.0123
50	53.2183	50	54.0397

Sidereal.	Solar.	Sidereal.	Solar.
6 20 00	6 18 57.7461	6 25 00	6 23 56.9270
10	6 19 07.7188	10	6 24 06.8997
20	17.6915	20	16.8724
30	27.6642	30	26.8451
40	37.6369	40	36.8178
50	47.6096	50	46.7905
6 21 00	57.5823	6 26 00	56.7632
10	6 20 07.5550	10	6 25 06.7359
20	17.5277	20	16.7086
30	27.5004	30	26.6812
40	37.4731	40	36.6539
50	47.4458	50	46.6266
6 22 00	57.4185	6 27 00	56.5993
10	6 21 07.3912	10	6 26 06.5720
20	17.3639	20	16.5447
30	27.3366	30	26.5174
40	37.3092	40	36.4901
50	47.2819	50	46.4628
6 23 00	57.2546	6 28 00	56.4355
10	6 22 07.2273	10	6 27 06.4082
20	17.2000	20	16.3809
30	27.1727	30	26.3536
40	37.1454	40	36.3263
50	47.1181	50	46.2990
6 24 00	57.0908	6 29 00	56.2717
10	6 23 07.0635	10	6 28 06.2444
20	17.0362	20	16.2171
30	27.0089	30	26.1898
40	36.9816	40	36.1625
50	46.9543	50	46.1352

Solar.	Sidereal.	Solar.	Sidereal.
6 30 00	6 31 04.0671	6 35 00	6 36 04.8884
10	14.0945	10	14.9158
20	24.1218	20	24.9432
30	34.1492	30	34.9706
40	44.1766	40	44.9980
50	54.2040	50	55.0253
6 31 00	6 32 04.2313	6 36 00	6 37 05.0527
10	14.2587	10	15.0801
20	24.2861	20	25.1075
30	34.3135	30	35.1349
40	44.3409	40	45.1622
50	54.3682	50	55.1896
6 32 00	6 33 04.3956	6 37 00	6 38 05.2170
10	14.4230	10	15.2444
20	24.4504	20	25.2718
30	34.4778	30	35.2991
40	44.5051	40	45.3265
50	54.5325	50	55.3539
6 33 00	6 34 04.5599	6 38 00	6 39 05.3813
10	14.5873	10	15.4086
20	24.6147	20	25.4360
30	34.6420	30	35.4634
40	44.6694	40	45.4908
50	54.6968	50	55.5182
6 34 00	6 35 04.7242	6 39 00	6 40 05.5455
10	14.7516	10	15.5729
20	24.7789	20	25.6003
30	34.8063	30	35.6277
40	44.8337	40	45.6551
50	54.8611	50	55.6824

Sidereal.	Solar.	Sidereal.	Solar.
6 30 00	6 28 56.1079	6 35 00	6 33 55.2887
10	6 29 06.0806	10	6 34 05.2614
20	16.0532	20	15.2341
30	26.0259	30	25.2068
40	35.9986	40	35.1795
50	45.9713	50	45.1522
6 31 00	55.9440	6 36 00	55.1249
10	6 30 05.9167	10	6 35 05.0976
20	15.8894	20	15.0703
30	25.8621	30	25.0430
40	35.8348	40	35.0157
50	45.8075	50	44.9884
6 32 00	55.7802	6 37 00	54.9611
10	6 31 05.7529	10	6 36 04.9338
20	15.7256	20	14.9065
30	25.6983	30	24.8792
40	35.6710	40	34.8519
50	45.6437	50	44.8246
6 33 00	55.6164	6 38 00	54.7972
10	6 32 05.5891	10	6 37 04.7699
20	15.5618	20	14.7426
30	25.5345	30	24.7153
40	35.5072	40	34.6880
50	45.4799	50	44.6607
6 34 00	55.4526	6 39 00	54.6334
10	6 33 05.4252	10	6 38 04.6061
20	15.3979	20	14.5788
30	25.3706	30	24.5515
40	35.3433	40	34.5242
50	45.3160	50	44.4969

Solar.	Sidereal.	Solar.	Sidereal.
6 40 00	6 41 05.7098	6 45 00	6 46 06.5312
10	15.7372	10	16.5586
20	25.7646	20	26.5860
30	35.7920	30	36.6133
40	45.8193	40	46.6407
50	55.8467	50	56.6681
6 41 00	6 42 05.8741	6 46 00	6 47 06.6955
10	15.9015	10	16.7228
20	25.9289	20	26.7502
30	35.9562	30	36.7776
40	45.9836	40	46.8050
50	56.0110	50	56.8324
6 42 00	6 43 06.0384	6 47 00	6 48 06.8597
10	16.0657	10	16.8871
20	26.0931	20	26.9145
30	36.1205	30	36.9419
40	46.1479	40	46.9693
50	56.1753	50	56.9966
6 43 00	6 44 06.2026	6 48 00	6 49 07.0240
10	16.2300	10	17.0514
20	26.2574	20	27.0788
30	36.2848	30	37.1062
40	46.3122	40	47.1335
50	56.3395	50	57.1609
6 44 00	6 45 06.3669	6 49 00	6 50 07.1883
10	16.3943	10	17.2157
20	26.4217	20	27.2430
30	36.4491	30	37.2704
40	46.4764	40	47.2978
50	56.5038	50	57.3252

Sidereal.	Solar.	Sidereal.	Solar.
6 40 00	6 38 54.4696	6 45 00	6 43 53.6505
10	6 39 04.4423	10	6 44 03.6232
20	14.4150	20	13.5959
30	24.3877	30	23.5686
40	34.3604	40	33.5412
50	44.3331	50	43.5139
6 41 00	54.3058	6 46 00	53.4866
10	6 40 04.2785	10	6 45 03.4593
20	14.2512	20	13.4320
30	24.2239	30	23.4047
40	34.1966	40	33.3774
50	44.1692	50	43.3501
6 42 00	54.1419	6 47 00	53.3228
10	6 41 04.1146	10	6 46 03.2955
20	14.0873	20	13.2682
30	24.0600	30	23.2409
40	34.0327	40	33.2136
50	44.0054	50	43.1863
6 43 00	53.9781	6 48 00	53.1590
10	6 42 03.9508	10	6 47 03.1317
20	13.9235	20	13.1044
30	23.8962	30	23.0771
40	33.8689	40	33.0498
50	43.8416	50	43.0225
6 44 00	53.8143	6 49 00	52.9952
10	6 43 03.7870	10	6 48 02.9679
20	13.7597	20	12.9406
30	23.7324	30	22.9133
40	33.7051	40	32.8859
50	43.6778	50	42.8586

Solar.	Sidereal.	Solar.	Sidereal.
6 50 00	6 51 07.3526	6 55 00	6 56 08.1739
10	17.3799	10	18.2013
20	27.4073	20	28.2287
30	37.4347	30	38.2561
40	47.4621	40	48.2835
50	57.4895	50	58.3108
6 51 00	6 52 07.5168	6 56 00	6 57 08.3382
10	17.5442	10	18.3656
20	27.5716	20	28.3930
30	37.5990	30	38.4203
40	47.6264	40	48.4477
50	57.6537	50	58.4751
6 52 00	6 53 07.6811	6 57 00	6 58 08.5025
10	17.7085	10	18.5299
20	27.7359	20	28.5572
30	37.7633	30	38.5846
40	47.7906	40	48.6120
50	57.8180	50	58.6394
6 53 00	6 54 07.8454	6 58 00	6 59 08.6668
10	17.8728	10	18.6941
20	27.9001	20	28.7215
30	37.9275	30	38.7489
40	47.9549	40	48.7763
50	57.9823	50	58.8037
6 54 00	6 55 08.0097	6 59 00	7 00 08.8310
10	18.0370	10	18.8584
20	28.0644	20	28.8858
30	38.0918	30	38.9132
40	48.1192	40	48.9406
50	58.1466	50	58.9679



Sidereal.	Solar.	Sidereal.	Solar.
6 50 00	6 48 52.8313	6 55 00	6 53 52.0122
10	6 49 02.8040	10	6 54 01.9849
20	12.7767	20	11.9576
30	22.7494	30	21.9303
40	32.7221	40	31.9030
50	42.6948	50	41.8757
6 51 00	52.6675	6 56 00	51.8484
10	6 50 02.6402	10	6 55 01.8211
20	12.6129	20	11.7938
30	22.5856	30	21.7665
40	32.5583	40	31.7392
50	42.5310	50	41.7119
6 52 00	52.5037	6 57 00	51.6846
10	6 51 02.4764	10	6 56 01.6573
20	12.4491	20	11.6299
30	22.4218	30	21.6026
40	32.3945	40	31.5753
50	42.3672	50	41.5480
6 53 00	52.3399	6 58 00	51.5207
10	6 52 02.3126	10	6 57 01.4934
20	12.2853	20	11.4661
30	22.2579	30	21.4388
40	32.2306	40	31.4115
50	42.2033	50	41.3842
6 54 00	52.1760	6 59 00	51.3569
10	6 53 02.1487	10	6 58 01.3296
20	12.1214	20	11.3023
30	22.0941	30	21.2750
40	32.0668	40	31.2477
50	42.0395	50	41.2204

Solar.	Sidereal.	Solar.	Sidereal.
7 00 00	7 01 08.9953	7 05 00	7 06 09.8167
10	19.0227	10	19.8441
20	29.0501	20	29.8714
30	39.0774	30	39.8988
40	49.1048	40	49.9262
50	59.1322	50	59.9536
7 01 00	7 02 09.1596	7 06 00	7 07 09.9810
10	19.1870	10	20.0083
20	29.2143	20	30.0357
30	39.2417	30	40.0631
40	49.2691	40	50.0905
50	59.2965	50	7 08 00.1179
7 02 00	7 03 09.3239	7 07 00	10.1452
10	19.3512	10	20.1726
20	29.3786	20	30.2000
30	39.4060	30	40.2274
40	49.4334	40	50.2547
50	59.4608	50	7 09 00.2821
7 03 00	7 04 09.4881	7 08 00	10.3095
10	19.5155	10	20.3369
20	29.5429	20	30.3643
30	39.5703	30	40.3916
40	49.5977	40	50.4190
50	59.6250	50	7 10 00.4464
7 04 00	7 05 09.6524	7 09 00	10.4738
10	19.6798	10	20.5012
20	29.7072	20	30.5285
30	39.7345	30	40.5559
40	49.7619	40	50.5833
50	59.7893	50	7 11 00.6107

Sidereal.	Solar.	Sidereal.	Solar.
7 00 00	6 58 51.1931	7 05 00	7 03 50.3739
10	6 59 01.1658	10	7 04 00.3466
20	11.1385	20	10.3193
30	21.1112	30	20.2920
40	31.0839	40	30.2647
50	41.0566	50	40.2374
7 01 00	51.0293	7 06 00	50.2101
10	7 00 01.0019	10	7 05 00.1828
20	10.9746	20	10.1555
30	20.9473	30	20.1282
40	30.9200	40	30.1009
50	40.8927	50	40.0736
7 02 00	50.8654	7 07 00	50.0463
10	7 01 00.8381	10	7 06 00.0190
20	10.8108	20	09.9917
30	20.7835	30	19.9644
40	30.7562	40	29.9371
50	40.7289	50	39.9098
7 03 00	50.7016	7 08 00	49.8825
10	7 02 00.6743	10	59.8552
20	10.6470	20	7 07 09.8279
30	20.6197	30	19.8006
40	30.5924	40	29.7733
50	40.5651	50	39.7459
7 04 00	50.5378	7 09 00	49.7186
10	7 03 00.5105	10	59.6913
20	10.4832	20	7 08 09.6640
30	20.4559	30	19.6367
40	30.4286	40	29.6094
50	40.4013	50	39.5821

Solar.	Sidereal.	Solar.	Sidereal.
7 10 00	7 11 10.6381	7 15 00	7 16 11.4594
10	20.6654	10	21.4868
20	30.6928	20	31.5142
30	40.7202	30	41.5416
40	50.7476	40	51.5689
50	7 12 00.7750	50	7 17 01.5963
7 11 00	10.8023	7 16 00	11.6237
10	20.8297	10	21.6511
20	30.8571	20	31.6785
30	40.8845	30	41.7058
40	50.9118	40	51.7332
50	7 13 00.9392	50	7 18 01.7606
7 12 00	10.9666	7 17 00	11.7880
10	20.9940	10	21.8154
20	31.0214	20	31.8427
30	41.0487	30	41.8701
40	51.0761	40	51.8975
50	7 14 01.1035	50	7 19 01.9249
7 13 00	11.1309	7 18 00	11.9523
10	21.1583	10	21.9796
20	31.1856	20	32.0070
30	41.2130	30	42.0344
40	51.2404	40	52.0618
50	7 15 01.2678	50	7 20 02.0891
7 14 00	11.2952	7 19 00	12.1165
10	21.3225	10	22.1439
20	31.3499	20	32.1713
30	41.3773	30	42.1987
40	51.4047	40	52.2260
50	7 16 01.4320	50	7 21 02.2534

Sidereal.	Solar.	Sidereal.	Solar.
7 10 00	7 08 49.5548	7 15 00	7 13 48.7357
10	59.5275	10	58.7084
20	7 09 09.5002	20	7 14 08.6811
30	19.4729	30	18.6538
40	29.4456	40	28.6265
50	39.4183	50	38.5992
7 11 00	49.3910	7 16 00	48.5719
10	59.3637	10	58.5446
20	7 10 09.3364	20	7 15 08.5173
30	19.3091	30	18.4899
40	29.2818	40	28.4626
50	39.2545	50	38.4353
7 12 00	49.2272	7 17 00	48.4080
10	59.1999	10	58.3807
20	7 11 09.1726	20	7 16 08.3534
30	19.1453	30	18.3261
40	29.1179	40	28.2988
50	39.0906	50	38.2715
7 13 00	49.0633	7 18 00	48.2442
10	59.0360	10	58.2169
20	7 12 09.0087	20	7 17 08.1896
30	18.9814	30	18.1623
40	28.9541	40	28.1350
50	38.9268	50	38.1077
7 14 00	48.8995	7 19 00	48.0804
10	58.8722	10	58.0531
20	7 13 08.8449	20	7 18 08.0258
30	18.8176	30	17.9985
40	28.7903	40	27.9712
50	38.7630	50	37.9439

Solar.	Sidereal.	Solar.	Sidereal.
7 20 00	7 21 12.2808	7 25 00	7 26 13.1022
10	22.3082	10	23.1296
20	32.3356	20	33.1569
30	42.3629	30	43.1843
40	52.3903	40	53.2117
50	7 22 02.4177	50	7 27 03.2391
7 21 00	12.4451	7 26 00	13.2664
10	22.4725	10	23.2938
20	32.4998	20	33.3212
30	42.5272	30	43.3486
40	52.5546	40	53.3760
50	7 23 02.5820	50	7 28 03.4033
7 22 00	12.6094	7 27 00	13.4307
10	22.6367	10	23.4581
20	32.6641	20	33.4855
30	42.6915	30	43.5129
40	52.7189	40	53.5402
50	7 24 02.7462	50	7 29 03.5676
7 23 00	12.7736	7 28 00	13.5950
10	22.8010	10	23.6224
20	32.8284	20	33.6498
30	42.8558	30	43.6771
40	52.8831	40	53.7045
50	7 25 02.9105	50	7 30 03.7319
7 24 00	12.9379	7 29 00	13.7593
10	22.9653	10	23.7867
20	32.9927	20	33.8140
30	43.0200	30	43.8414
40	53.0474	40	53.8688
50	7 26 03.0748	50	7 31 03.8962

Sidereal.	Solar.	Sidereal.	Solar.
7 20 00	7 18 47.9166	7 25 00	7 23 47.0974
10	57.8893	10	57.0701
20	7 19 07.8619	20	7 24 07.0428
30	17.8346	30	17.0155
40	27.8073	40	26.9882
50	37.7800	50	36.9609
7 21 00	47.7527	7 26 00	46.9336
10	57.7254	10	56.9063
20	7 20 07.6981	20	7 25 06.8790
30	17.6708	30	16.8517
40	27.6435	40	26.8244
50	37.6162	50	36.7971
7 22 00	47.5889	7 27 00	46.7698
10	57.5616	10	56.7425
20	7 21 07.5343	20	7 26 06.7152
30	17.5070	30	16.6879
40	27.4797	40	26.6606
50	37.4524	50	36.6333
7 23 00	47.4251	7 28 00	46.6059
10	57.3978	10	56.5786
20	7 22 07.3705	20	7 27 06.5513
30	17.3432	30	16.5240
40	27.3159	40	26.4967
50	37.2886	50	36.4694
7 24 00	47.2613	7 29 00	46.4421
10	57.2339	10	56.4148
20	7 23 07.2066	20	7 28 06.3875
30	17.1793	30	16.3602
40	27.1520	40	26.3329
50	37.1247	50	36.3056

Solar.	Sidereal.	Solar.	Sidereal.
7 30 00	7 31 13.9235	7 35 00	7 36 14.7449
10	23.9509	10	24.7723
20	33.9783	20	34.7997
30	44.0057	30	44.8271
40	54.0331	40	54.8544
50	7 32 04.0604	50	7 37 04.8818
7 31 00	14.0878	7 36 00	14.9092
10	24.1152	10	24.9366
20	34.1426	20	34.9640
30	44.1700	30	44.9913
40	54.1973	40	55.0187
50	7 33 04.2247	50	7 38 05.0461
7 32 00	14.2521	7 37 00	15.0735
10	24.2795	10	25.1008
20	34.3069	20	35.1282
30	44.3342	30	45.1556
40	54.3616	40	55.1830
50	7 34 04.3890	50	7 39 05.2104
7 33 00	14.4164	7 38 00	15.2377
10	24.4437	10	25.2651
20	34.4711	20	35.2925
30	44.4985	30	45.3199
40	54.5259	40	55.3473
50	7 35 04.5533	50	7 40 05.3746
7 34 00	14.5806	7 39 00	15.4020
10	24.6080	10	25.4294
20	34.6354	20	35.4568
30	44.6628	30	45.4842
40	54.6902	40	55.5115
50	7 36 04.7175	50	7 41 05.5389



Sidereal.	Solar.	Sidereal.	Solar.
7 30 00	7 28 46.2783	7 35 00	7 33 45.4592
10	56.2510	10	55.4319
20	7 29 06.2237	20	7 34 05.4046
30	16.1964	30	15.3773
40	26.1691	40	25.3499
50	36.1418	50	35.3226
7 31 00	46.1145	7 36 00	45.2953
10	56.0872	10	55.2680
20	7 30 06.0599	20	7 35 05.2407
30	16.0326	30	15.2134
40	26.0053	40	25.1861
50	35.9779	50	35.1588
7 32 00	45.9506	7 37 00	45.1315
10	55.9233	10	55.1042
20	7 31 05.8960	20	7 36 05.0769
30	15.8687	30	15.0496
40	25.8414	40	25.0223
50	35.8141	50	34.9950
7 33 00	45.7868	7 38 00	44.9677
10	55.7595	10	54.9404
20	7 32 05.7322	20	7 37 04.9131
30	15.7049	30	14.8858
40	25.6776	40	24.8585
50	35.6503	50	34.8312
7 34 00	45.6230	7 39 00	44.8039
10	55.5957	10	54.7766
20	7 33 05.5684	20	7 38 04.7493
30	15.5411	30	14.7219
40	25.5138	40	24.6946
50	35.4865	50	34.6673

Solar.	Sidereal.	Solar.	Sidereal.
7 40 00	7 41 15.5663	7 45 00	7 46 16.3877
10	25.5937	10	26.4150
20	35.6211	20	36.4424
30	45.6484	30	46.4698
40	55.6758	40	56.4972
50	7 42 05.7032	50	7 47 06.5246
7 41 00	15.7306	7 46 00	16.5519
10	25.7579	10	26.5793
20	35.7853	20	36.6067
30	45.8127	30	46.6341
40	55.8401	40	56.6615
50	7 43 05.8675	50	7 48 06.6888
7 42 00	15.8948	7 47 00	16.7162
10	25.9222	10	26.7436
20	35.9496	20	36.7710
30	45.9770	30	46.7984
40	56.0044	40	56.8257
50	7 44 06.0317	50	7 49 06.8531
7 43 00	16.0591	7 48 00	16.8805
10	26.0865	10	26.9079
20	36.1139	20	36.9352
30	46.1413	30	46.9626
40	56.1686	40	56.9900
50	7 45 06.1960	50	7 50 07.0174
7 44 00	16.2234	7 49 00	17.0448
10	26.2508	10	27.0721
20	36.2781	20	37.0995
30	46.3055	30	47.1269
40	56.3329	40	57.1543
50	7 46 06.3603	50	7 51 07.1817

Sidereal.	Solar.	Sidereal.	Solar.
7 40 00	7 38 44.6400	7 45 00	7 43 43.8209
10	54.6127	10	53.7936
20	7 39 04.5854	20	7 44 03.7663
30	14.5581	30	13.7390
40	24.5308	40	23.7117
50	34.5035	50	33.6844
7 41 00	44.4762	7 46 00	43.6571
10	54.4489	10	53.6298
20	7 40 04.4216	20	7 45 03.6025
30	14.3943	30	13.5752
40	24.3670	40	23.5479
50	34.3397	50	33.5206
7 42 00	44.3124	7 47 00	43.4933
10	54.2851	10	53.4660
20	7 41 04.2578	20	7 46 03.4386
30	14.2305	30	13.4113
40	24.2032	40	23.3840
50	34.1759	50	33.3567
7 43 00	44.1486	7 48 00	43.3294
10	54.1213	10	53.3021
20	7 42 04.0940	20	7 47 03.2748
30	14.0666	30	13.2475
40	24.0393	40	23.2202
50	34.0120	50	33.1929
7 44 00	43.9847	7 49 00	43.1656
10	53.9574	10	53.1383
20	7 43 03.9301	20	7 48 03.1110
30	13.9028	30	13.0837
40	23.8755	40	23.0564
50	33.8482	50	33.0291

Solar.	Sidereal.	Solar.	Sidereal.
7 50 00	7 51 17.2090	7 55 00	7 56 18.0304
10	27.2364	10	28.0578
20	37.2638	20	38.0852
30	47.2912	30	48.1125
40	57.3186	40	58.1399
50	7 52 07.3459	50	7 57 08.1673
7 51 00	17.3733	7 56 00	18.1947
10	27.4007	10	28.2221
20	37.4281	20	38.2494
30	47.4554	30	48.2768
40	57.4828	40	58.3042
50	7 53 07.5102	50	7 58 08.3316
7 52 00	17.5376	7 57 00	18.3590
10	27.5650	10	28.3863
20	37.5923	20	38.4137
30	47.6197	30	48.4411
40	57.6471	40	58.4685
50	7 54 07.6745	50	7 59 08.4959
7 53 00	17.7019	7 58 00	18.5232
10	27.7292	10	28.5506
20	37.7566	20	38.5780
30	47.7840	30	48.6054
40	57.8114	40	58.6328
50	7 55 07.8388	50	8 00 08.6601
7 54 00	17.8661	7 59 00	18.6875
10	27.8935	10	28.7149
20	37.9209	20	38.7423
30	47.9483	30	48.7696
40	57.9757	40	58.7970
50	7 56 08.0030	50	8 01 08.8244

Sidereal.	Solar.	Sidereal.	Solar.
7 50 00	7 48 43.0018	7 55 00	7 53 42.1826
10	52.9745	10	52.1553
20	7 49 02.9472	20	7 54 02.1280
30	12.9199	30	12.1007
40	22.8926	40	22.0734
50	32.8653	50	32.0461
7 51 00	42.8380	7 56 00	42.0188
10	52.8106	10	51.9915
20	7 50 02.7833	20	7 55 01.9642
30	12.7560	30	11.9369
40	22.7287	40	21.9096
50	32.7014	50	31.8823
7 52 00	42.6741	7 57 00	41.8550
10	52.6468	10	51.8277
20	7 51 02.6195	20	7 56 01.8004
30	12.5922	30	11.7731
40	22.5649	40	21.7458
50	32.5376	50	31.7185
7 53 00	42.5103	7 58 00	41.6912
10	52.4830	10	51.6639
20	7 52 02.4557	20	7 57 01.6366
30	12.4284	30	11.6093
40	22.4011	40	21.5820
50	32.3738	50	31.5546
7 54 00	42.3465	7 59 00	41.5273
10	52.3192	10	51.5000
20	7 53 02.2919	20	7 58 01.4727
30	12.2646	30	11.4454
40	22.2373	40	21.4181
50	32.2100	50	31.3908

Solar.	Sidereal.	Solar.	Sidereal.
8 00 00	8 01 18.8518	8 05 00	8 06 19.6732
10	28.8792	10	29.7005
20	38.9065	20	39.7279
30	48.9339	30	49.7553
40	58.9613	40	59.7827
50	8 02 08.9887	50	8 07 09.8101
8 01 00	19.0161	8 06 00	19.8374
10	29.0434	10	29.8648
20	39.0708	20	39.8922
30	49.0982	30	49.9196
40	59.1256	40	59.9469
50	8 03 09.1530	50	8 08 09.9743
8 02 00	19.1803	8 07 00	20.0017
10	29.2077	10	30.0291
20	39.2351	20	40.0565
30	49.2625	30	50.0838
40	59.2898	40	8 09 00.1112
50	8 04 09.3172	50	10.1386
8 03 00	19.3446	8 08 00	20.1660
10	29.3720	10	30.1934
20	39.3994	20	40.2207
30	49.4267	30	50.2481
40	59.4541	40	8 10 00.2755
50	8 05 09.4815	50	10.3029
8 04 00	19.5089	8 09 00	20.3303
10	29.5363	10	30.3576
20	39.5636	20	40.3850
30	49.5910	30	50.4124
40	59.6184	40	8 11 00.4398
50	8 06 09.6458	50	10.4671

Sidereal.	Solar.	Sidereal.	Solar.
8 00 00	7 58 41.3635	8 05 00	8 03 40.5444
10	51.3362	10	50.5171
20	7 59 01.3089	20	8 04 00.4898
30	11.2816	30	10.4625
40	21.2543	40	20.4352
50	31.2270	50	30.4079
8 01 00	41.1997	8 06 00	40.3806
10	51.1724	10	50.3533
20	8 00 01.1451	20	8 05 00.3260
30	11.1178	30	10.2986
40	21.0905	40	20.2713
50	31.0632	50	30.2440
8 02 00	41.0359	8 07 00	40.2167
10	51.0086	10	50.1894
20	8 01 00.9813	20	8 06 00.1621
30	10.9540	30	10.1348
40	20.9266	40	20.1075
50	30.8993	50	30.0802
8 03 00	40.8720	8 08 00	40.0529
10	50.8447	10	50.0256
20	8 02 00.8174	20	59.9983
30	10.7901	30	8 07 09.9710
40	20.7628	40	19.9437
50	30.7355	50	29.9164
8 04 00	40.7082	8 09 00	39.8891
10	50.6809	10	49.8618
20	8 03 00.6536	20	59.8345
30	10.6263	30	8 08 09.8072
40	20.5990	40	19.7799
50	30.5717	50	29.7526

Solar.	Sidereal.	Solar.	Sidereal.
8 10 00	8 11 20.4945	8 15 00	8 16 21.3159
10	30.5219	10	31.3433
20	40.5493	20	41.3707
30	50.5767	30	51.3980
40	8 12 00.6040	40	8 17 01.4254
50	10.6314	50	11.4528
8 11 00	20.6588	8 16 00	21.4802
10	30.6862	10	31.5076
20	40.7136	20	41.5349
30	50.7409	30	51.5623
40	8 13 00.7683	40	8 18 01.5897
50	10.7957	50	11.6171
8 12 00	20.8231	8 17 00	21.6445
10	30.8505	10	31.6718
20	40.8778	20	41.6992
30	50.9052	30	51.7266
40	8 14 00.9326	40	8 19 01.7540
50	10.9600	50	11.7813
8 13 00	20.9874	8 18 00	21.8087
10	31.0147	10	31.8361
20	41.0421	20	41.8635
30	51.0695	30	51.8909
40	8 15 01.0969	40	8 20 01.9182
50	11.1242	50	11.9456
8 14 00	21.1516	8 19 00	21.9730
10	31.1790	10	32.0004
20	41.2064	20	42.0278
30	51.2338	30	52.0551
40	8 16 01.2611	40	8 21 02.0825
50	11.2885	50	12.1099



Sidereal.	Solar.	Sidereal.	Solar.
8 10 00	8 08 39.7253	8 15 00	8 13 38.9061
10	49.6980	10	48.8788
20	59.6706	20	58.8515
30	8 09 09.6433	30	8 14 08.8242
40	19.6160	40	18.7969
50	29.5887	50	28.7696
8 11 00	39.5614	8 16 00	38.7423
10	49.5341	10	48.7150
20	59.5068	20	58.6877
30	8 10 09.4795	30	8 15 08.6604
40	19.4522	40	18.6331
50	29.4249	50	28.6058
8 12 00	39.3976	8 17 00	38.5785
10	49.3703	10	48.5512
20	59.3430	20	58.5239
30	8 11 09.3157	30	8 16 08.4966
40	19.2884	40	18.4693
50	29.2611	50	28.4420
8 13 00	39.2338	8 18 00	38.4146
10	49.2065	10	48.3873
20	59.1792	20	58.3600
30	8 12 09.1519	30	8 17 08.3327
40	19.1246	40	18.3054
50	29.0973	50	28.2781
8 14 00	39.0700	8 19 00	38.2508
10	49.0426	10	48.2235
20	59.0153	20	58.1962
30	8 13 08.9880	30	8 18 08.1689
40	18.9607	40	18.1416
50	28.9334	50	28.1143

Solar.	Sidereal.	Solar.	Sidereal.
8 20 00	8 21 22.1373	8 25 00	8 26 22.9586
10	32.1647	10	32.9860
20	42.1920	20	43.0134
30	52.2194	30	53.0408
40	8 22 02.2468	40	8 27 03.0682
50	12.2742	50	13.0955
8 21 00	22.3015	8 26 00	23.1229
10	32.3289	10	33.1503
20	42.3563	20	43.1777
30	52.3837	30	53.2051
40	8 23 02.4111	40	8 28 03.2324
50	12.4384	50	13.2598
8 22 00	22.4658	8 27 00	23.2872
10	32.4932	10	33.3146
20	42.5206	20	43.3420
30	52.5480	30	53.3693
40	8 24 02.5753	40	8 29 03.3967
50	12.6027	50	13.4241
8 23 00	22.6301	8 28 00	23.4515
10	32.6575	10	33.4788
20	42.6849	20	43.5062
30	52.7122	30	53.5336
40	8 25 02.7396	40	8 30 03.5610
50	12.7670	50	13.5884
8 24 00	22.7944	8 29 00	23.6157
10	32.8218	10	33.6431
20	42.8491	20	43.6705
30	52.8765	30	53.6979
40	8 26 02.9039	40	8 31 03.7253
50	12.9313	50	13.7526

Sidereal.	Solar.	Sidereal.	Solar.
8 20 00	8 18 38.0870	8 25 00	8 23 37.2679
10	48.0597	10	47.2406
20	58.0324	20	57.2133
30	8 19 08.0051	30	8 24 07.1860
40	17.9778	40	17.1586
50	27.9505	50	27.1313
8 21 00	37.9232	8 26 00	37.1040
10	47.8959	10	47.0767
20	57.8686	20	57.0494
30	8 20 07.8413	30	8 25 07.0221
40	17.8140	40	16.9948
50	27.7866	50	26.9675
8 22 00	37.7593	8 27 00	36.9402
10	47.7320	10	46.9129
20	57.7047	20	56.8856
30	8 21 07.6774	30	8 26 06.8583
40	17.6501	40	16.8310
50	27.6228	50	26.8037
8 23 00	37.5955	8 28 00	36.7764
10	47.5682	10	46.7491
20	57.5409	20	56.7218
30	8 22 07.5136	30	8 27 06.6945
40	17.4863	40	16.6672
50	27.4590	50	26.6399
8 24 00	37.4317	8 29 00	36.6126
10	47.4044	10	46.5853
20	57.3771	20	56.5580
30	8 23 07.3498	30	8 28 06.5306
40	17.3225	40	16.5033
50	27.2952	50	26.4760

Solar.	Sidereal.	Solar.	Sidereal.
8 30 00	8 31 23.7800	8 35 00	8 36 24.6014
10	33.8074	10	34.6288
20	43.8348	20	44.6562
30	53.8622	30	54.6835
40	8 32 03.8895	40	8 37 04.7109
50	13.9169	50	14.7383
8 31 00	23.9443	8 36 00	24.7657
10	33.9717	10	34.7930
20	43.9991	20	44.8204
30	54.0264	30	54.8478
40	8 33 04.0538	40	8 38 04.8752
50	14.0812	50	14.9026
8 32 00	24.1086	8 37 00	24.9299
10	34.1359	10	34.9573
20	44.1633	20	44.9847
30	54.1907	30	55.0121
40	8 34 04.2181	40	8 39 05.0395
50	14.2455	50	15.0668
8 33 00	24.2728	8 38 00	25.0942
10	34.3002	10	35.1216
20	44.3276	20	45.1490
30	54.3550	30	55.1764
40	8 35 04.3824	40	8 40 05.2037
50	14.4097	50	15.2311
8 34 00	24.4371	8 39 00	25.2585
10	34.4645	10	35.2859
20	44.4919	20	45.3132
30	54.5193	30	55.3406
40	8 36 04.5466	40	8 41 05.3680
50	14.5740	50	15.3954

Sidereal.	Solar.	Sidereal.	Solar.
8 30 00	8 28 36.4487	8 35 00	8 33 35.6296
10	46.4214	10	45.6023
20	56.3941	20	55.5750
30	8 29 06.3668	30	8 34 05.5477
40	16.3395	40	15.5204
50	26.3122	50	25.4931
8 31 00	36.2849	8 36 00	35.4658
10	46.2576	10	45.4385
20	56.2303	20	55.4112
30	8 30 06.2030	30	8 35 05.3839
40	16.1757	40	15.3566
50	26.1484	50	25.3293
8 32 00	36.1211	8 37 00	35.3020
10	46.0938	10	45.2747
20	56.0665	20	55.2473
30	8 31 06.0392	30	8 36 05.2200
40	16.0119	40	15.1927
50	25.9846	50	25.1654
8 33 00	35.9573	8 38 00	35.1381
10	45.9300	10	45.1108
20	55.9026	20	55.0835
30	8 32 05.8753	30	8 37 05.0562
40	15.8480	40	15.0289
50	25.8207	50	25.0016
8 34 00	35.7934	8 39 00	34.9743
10	45.7661	10	44.9470
20	55.7388	20	54.9197
30	8 33 05.7115	30	8 38 04.8924
40	15.6842	40	14.8651
50	25.6569	50	24.8378

Solar.	Sidereal.	Solar.	Sidereal.
8 40 00	8 41 25.4228	8 45 00	8 46 26.2441
10	35.4501	10	36.2715
20	45.4775	20	46.2989
30	55.5049	30	56.3263
40	8 42 05.5323	40	8 47 06.3537
50	15.5597	50	16.3810
8 41 00	25.5870	8 46 00	26.4084
10	35.6144	10	36.4358
20	45.6418	20	46.4632
30	55.6692	30	56.4905
40	8 43 05.6966	40	8 48 06.5179
50	15.7239	50	16.5453
8 42 00	25.7513	8 47 00	26.5727
10	35.7787	10	36.6001
20	45.8061	20	46.6274
30	55.8335	30	56.6548
40	8 44 05.8608	40	8 49 06.6822
50	15.8882	50	16.7096
8 43 00	25.9156	8 48 00	26.7370
10	35.9430	10	36.7643
20	45.9703	20	46.7917
30	55.9977	30	56.8191
40	8 45 06.0251	40	8 50 06.8465
50	16.0525	50	16.8739
8 44 00	26.0799	8 49 00	26.9012
10	36.1072	10	36.9286
20	46.1346	20	46.9560
30	56.1620	30	56.9834
40	8 46 06.1894	40	8 51 07.0108
50	16.2168	50	17.0381

Sidereal.	Solar.	Sidereal.	Solar.
8 40 00	8 38 34.8105	8 45 00	8 43 33.9913
10	44.7832	10	43.9640
20	54.7559	20	53.9367
30	8 39 04.7286	30	8 44 03.9094
40	14.7013	40	13.8821
50	24.6740	50	23.8548
8 41 00	34.6467	8 46 00	33.8275
10	44.6193	10	43.8002
20	54.5920	20	53.7729
30	8 40 04.5647	30	8 45 03.7456
40	14.5374	40	13.7183
50	24.5101	50	23.6910
8 42 00	34.4828	8 47 00	33.6637
10	44.4555	10	43.6364
20	54.4282	20	53.6091
30	8 41 04.4009	30	8 46 03.5818
40	14.3736	40	13.5545
50	24.3463	50	23.5272
8 43 00	34.3190	8 48 00	33.4999
10	44.2917	10	43.4726
20	54.2644	20	53.4453
30	8 42 04.2371	30	8 47 03.4180
40	14.2098	40	13.3907
50	24.1825	50	23.3633
8 44 00	34.1552	8 49 00	33.3360
10	44.1279	10	43.3087
20	54.1006	20	53.2814
30	8 43 04.0733	30	8 48 03.2541
40	14.0460	40	13.2268
50	24.0187	50	23.1995

Solar.	Sidereal.	Solar.	Sidereal.
8 50 00	8 51 27.0655	8 55 00	8 56 27.8869
10	37.0929	10	37.9143
20	47.1203	20	47.9416
30	57.1476	30	57.9690
40	8 52 07.1750	40	8 57 07.9964
50	17.2024	50	18.0238
8 51 00	27.2298	8 56 00	28.0512
10	37.2572	10	38.0785
20	47.2845	20	48.1059
30	57.3119	30	58.1333
40	8 53 07.3393	40	8 58 08.1607
50	17.3667	50	18.1881
8 52 00	27.3941	8 57 00	28.2154
10	37.4214	10	38.2428
20	47.4488	20	48.2702
30	57.4762	30	58.2976
40	8 54 07.5036	40	8 59 08.3249
50	17.5310	50	18.3523
8 53 00	27.5583	8 58 00	28.3797
10	37.5857	10	38.4071
20	47.6131	20	48.4345
30	57.6405	30	58.4618
40	8 55 07.6679	40	9 00 08.4892
50	17.6952	50	18.5166
8 54 00	27.7226	8 59 00	28.5440
10	37.7500	10	38.5714
20	47.7774	20	48.5987
30	57.8047	30	58.6261
40	8 56 07.8321	40	9 01 08.6535
50	17.8595	50	18.6809



Sidereal.	Solar.	Sidereal.	Solar.
8 50 00	8 48 33.1722	8 55 00	8 53 32.3531
10	43.1449	10	42.3258
20	53.1176	20	52.2985
30	8 49 03.0903	30	8 54 02.2712
40	13.0630	40	12.2439
50	23.0357	50	22.2166
8 51 00	33.0084	8 56 00	32.1893
10	42.9811	10	42.1620
20	52.9538	20	52.1347
30	8 50 02.9265	30	8 55 02.1073
40	12.8992	40	12.0800
50	22.8719	50	22.0527
8 52 00	32.8446	8 57 00	32.0254
10	42.8173	10	41.9981
20	52.7900	20	51.9708
30	8 51 02.7627	30	8 56 01.9435
40	12.7353	40	11.9162
50	22.7080	50	21.8889
8 53 00	32.6807	8 58 00	31.8616
10	42.6534	10	41.8343
20	52.6261	20	51.8070
30	8 52 02.5988	30	8 57 01.7797
40	12.5715	40	11.7524
50	22.5442	50	21.7251
8 54 00	32.5169	8 59 00	31.6978
10	42.4896	10	41.6705
20	52.4623	20	51.6432
30	8 53 02.4350	30	8 58 01.6159
40	12.4077	40	11.5886
50	22.3804	50	21.5613

Solar.	Sidereal.	Solar.	Sidereal.
9 00 00	9 01 28.7083	9 05 00	9 06 29.5296
10	38.7356	10	39.5570
20	48.7630	20	49.5844
30	58.7904	30	59.6118
40	9 02 08.8178	40	9 07 09.6391
50	18.8452	50	19.6665
9 01 00	28.8725	9 06 00	29.6939
10	38.8999	10	39.7213
20	48.9273	20	49.7487
30	58.9547	30	59.7760
40	9 03 08.9820	40	9 08 09.8034
50	19.0094	50	19.8308
9 02 00	29.0368	9 07 00	29.8582
10	39.0642	10	39.8856
20	49.0916	20	49.9129
30	59.1189	30	59.9403
40	9 04 09.1463	40	9 09 09.9677
50	19.1737	50	19.9951
9 03 00	29.2011	9 08 00	30.0225
10	39.2285	10	40.0498
20	49.2558	20	50.0772
30	59.2832	30	9 10 00.1046
40	9 05 09.3106	40	10.1320
50	19.3380	50	20.1593
9 04 00	29.3654	9 09 00	30.1867
10	39.3927	10	40.2141
20	49.4201	20	50.2415
30	59.4475	30	9 11 00.2689
40	9 06 09.4749	40	10.2962
50	19.5022	50	20.3236

Sidereal.	Solar.	Sidereal.	Solar.
9 00 00	8 58 31.5340	9 05 00	9 03 30.7148
10	41.5067	10	40.6875
20	51.4793	20	50.6602
30	8 59 01.4520	30	9 04 00.6329
40	11.4247	40	10.6056
50	21.3974	50	20.5783
9 01 00	31.3701	9 06 00	30.5510
10	41.3428	10	40.5237
20	51.3155	20	50.4964
30	9 00 01.2882	30	9 05 00.4691
40	11.2609	40	10.4418
50	21.2336	50	20.4145
9 02 00	31.2063	9 07 00	30.3872
10	41.1790	10	40.3599
20	51.1517	20	50.3326
30	9 01 01.1244	30	9 06 00.3053
40	11.0971	40	10.2780
50	21.0698	50	20.2507
9 03 00	31.0425	9 08 00	30.2233
10	41.0152	10	40.1960
20	50.9879	20	50.1687
30	9 02 00.9606	30	9 07 00.1414
40	10.9333	40	10.1141
50	20.9060	50	20.0868
9 04 00	30.8787	9 09 00	30.0595
10	40.8513	10	40.0322
20	50.8240	20	50.0049
30	9 03 00.7967	30	59.9776
40	10.7694	40	9 08 09.9503
50	20.7421	50	19.9230

Solar.	Sidereal.	Solar.	Sidereal.
9 10 00	9 11 30.3510	9 15 00	9 16 31.1724
10	40.3784	10	41.1998
20	50.4058	20	51.2271
30	9 12 00.4331	30	9 17 01.2545
40	10.4605	40	11.2819
50	20.4879	50	21.3093
9 11 00	30.5153	9 16 00	31.3366
10	40.5427	10	41.3640
20	50.5700	20	51.3914
30	9 13 00.5974	30	9 18 01.4188
40	10.6248	40	11.4462
50	20.6522	50	21.4735
9 12 00	30.6796	9 17 00	31.5009
10	40.7069	10	41.5283
20	50.7343	20	51.5557
30	9 14 00.7617	30	9 19 01.5831
40	10.7891	40	11.6104
50	20.8164	50	21.6378
9 13 00	30.8438	9 18 00	31.6652
10	40.8712	10	41.6926
20	50.8986	20	51.7200
30	9 15 00.9260	30	9 20 01.7473
40	10.9533	40	11.7747
50	20.9807	50	21.8021
9 14 00	31.0081	9 19 00	31.8295
10	41.0355	10	41.8569
20	51.0629	20	51.8842
30	9 16 01.0902	30	9 21 01.9116
40	11.1176	40	11.9390
50	21.1450	50	21.9664

Sidereal.	Solar.	Sidereal.	Solar.
9 10 00	9 08 29.8957	9 15 00	9 13 29.0766
10	39.8684	10	39.0493
20	49.8411	20	49.0220
30	59.8138	30	58.9947
40	9 09 09.7865	40	9 14 08.9673
50	19.7592	50	18.9400
9 11 00	29.7319	9 16 00	28.9127
10	39.7046	10	38.8854
20	49.6773	20	48.8581
30	59.6500	30	58.8308
40	9 10 09.6227	40	9 15 08.8035
50	19.5953	50	18.7762
9 12 00	29.5680	9 17 00	28.7489
10	39.5407	10	38.7216
20	49.5134	20	48.6943
30	59.4861	30	58.6670
40	9 11 09.4588	40	9 16 08.6397
50	19.4315	50	18.6124
9 13 00	29.4042	9 18 00	28.5851
10	39.3769	10	38.5578
20	49.3496	20	48.5305
30	59.3223	30	58.5032
40	9 12 09.2950	40	9 17 08.4759
50	19.2677	50	18.4486
9 14 00	29.2404	9 19 00	28.4213
10	39.2131	10	38.3940
20	49.1858	20	48.3667
30	59.1585	30	58.3393
40	9 13 09.1312	40	9 18 08.3120
50	19.1039	50	18.2847

Solar.	Sidereal.	Solar.	Sidereal.
9 20 00	9 21 31.9937	9 25 00	9 26 32.8151
10	42.0211	10	42.8425
20	52.0485	20	52.8699
30	9 22 02.0759	30	9 27 02.8973
40	12.1033	40	12.9246
50	22.1306	50	22.9520
9 21 00	32.1580	9 26 00	32.9794
10	42.1854	10	43.0068
20	52.2128	20	53.0342
30	9 23 02.2402	30	9 28 03.0615
40	12.2675	40	13.0889
50	22.2949	50	23.1163
9 22 00	32.3223	9 27 00	33.1437
10	42.3497	10	43.1710
20	52.3771	20	53.1984
30	9 24 02.4044	30	9 29 03.2258
40	12.4318	40	13.2532
50	22.4592	50	23.2806
9 23 00	32.4866	9 28 00	33.3079
10	42.5139	10	43.3353
20	52.5413	20	53.3627
30	9 25 02.5687	30	9 30 03.3901
40	12.5961	40	13.4175
50	22.6235	50	23.4448
9 24 00	32.6508	9 29 00	33.4722
10	42.6782	10	43.4996
20	52.7056	20	53.5270
30	9 26 02.7330	30	9 31 03.5544
40	12.7604	40	13.5817
50	22.7877	50	23.6091

Sidereal.	Solar.	Sidereal.	Solar.
9 20 00	9 18 28.2574	9 25 00	9 23 27.4383
10	38.2301	10	37.4110
20	48.2028	20	47.3837
30	58.1755	30	57.3564
40	9 19 08.1482	40	9 24 07.3291
50	18.1209	50	17.3018
9 21 00	28.0936	9 26 00	27.2745
10	38.0663	10	37.2472
20	48.0390	20	47.2199
30	58.0117	30	57.1926
40	9 20 07.9844	40	9 25 07.1653
50	17.9571	50	17.1380
9 22 00	27.9298	9 27 00	27.1107
10	37.9025	10	37.0833
20	47.8752	20	47.0560
30	57.8479	30	57.0287
40	9 21 07.8206	40	9 26 07.0014
50	17.7933	50	16.9741
9 23 00	27.7660	9 28 00	26.9468
10	37.7387	10	36.9195
20	47.7113	20	46.8922
30	57.6840	30	56.8649
40	9 22 07.6567	40	9 27 06.8376
50	17.6294	50	16.8103
9 24 00	27.6021	9 29 00	26.7830
10	37.5748	10	36.7557
20	47.5475	20	46.7284
30	57.5202	30	56.7011
40	9 23 07.4929	40	9 28 06.6738
50	17.4656	50	16.6465

Solar.	Sidereal.	Solar.	Sidereal.
9 30 00	9 31 33.6365	9 35 00	9 36 34.4579
10	43.6639	10	44.4852
20	53.6913	20	54.5126
30	9 32 03.7186	30	9 37 04.5400
40	13.7460	40	14.5674
50	23.7734	50	24.5948
9 31 00	33.8008	9 36 00	34.6221
10	43.8281	10	44.6495
20	53.8555	20	54.6769
30	9 33 03.8829	30	9 38 04.7043
40	13.9103	40	14.7317
50	23.9377	50	24.7590
9 32 00	33.9650	9 37 00	34.7864
10	43.9924	10	44.8138
20	54.0198	20	54.8412
30	9 34 04.0472	30	9 39 04.8686
40	14.0746	40	14.8959
50	24.1019	50	24.9233
9 33 00	34.1293	9 38 00	34.9507
10	44.1567	10	44.9781
20	54.1841	20	55.0054
30	9 35 04.2115	30	9 40 05.0328
40	14.2388	40	15.0602
50	24.2662	50	25.0876
9 34 00	34.2936	9 39 00	35.1150
10	44.3210	10	45.1423
20	54.3483	20	55.1697
30	9 36 04.3757	30	9 41 05.1971
40	14.4031	40	15.2245
50	24.4305	50	25.2519



Sidereal.	Solar.	Sidereal.	Solar.
9 30 00	9 28 26.6192	9 35 00	9 33 25.8000
10	36.5919	10	35.7727
20	46.5646	20	45.7454
30	56.5373	30	55.7181
40	9 29 06.5100	40	9 34 05.6908
50	16.4827	50	15.6635
9 31 00	26.4554	9 36 00	25.6362
10	36.4280	10	35.6089
20	46.4007	20	45.5816
30	56.3734	30	55.5543
40	9 30 06.3461	40	9 35 05.5270
50	16.3188	50	15.4997
9 32 00	26.2915	9 37 00	25.4724
10	36.2642	10	35.4451
20	46.2369	20	45.4178
30	56.2096	30	55.3905
40	9 31 06.1823	40	9 36 05.3632
50	16.1550	50	15.3359
9 33 00	26.1277	9 38 00	25.3086
10	36.1004	10	35.2813
20	46.0731	20	45.2540
30	56.0458	30	55.2267
40	9 32 06.0185	40	9 37 05.1994
50	15.9912	50	15.1720
9 34 00	25.9639	9 39 00	25.1447
10	35.9366	10	35.1174
20	45.9093	20	45.0901
30	55.8820	30	55.0628
40	9 33 05.8547	40	9 38 05.0355
50	15.8274	50	15.0082

Solar.	Sidereal.	Solar.	Sidereal.
9 40 00	9 41 35.2792	9 45 00	9 46 36.1006
10	45.3066	10	46.1280
20	55.3340	20	56.1554
30	9 42 05.3614	30	9 47 06.1827
40	15.3888	40	16.2101
50	25.4161	50	26.2375
9 41 00	35.4435	9 46 00	36.2649
10	45.4709	10	46.2923
20	55.4983	20	56.3196
30	9 43 05.5256	30	9 48 06.3470
40	15.5530	40	16.3744
50	25.5804	50	26.4018
9 42 00	35.6078	9 47 00	36.4292
10	45.6352	10	46.4565
20	55.6625	20	56.4839
30	9 44 05.6899	30	9 49 06.5113
40	15.7173	40	16.5387
50	25.7447	50	26.5661
9 43 00	35.7721	9 48 00	36.5934
10	45.7994	10	46.6208
20	55.8268	20	56.6482
30	9 45 05.8542	30	9 50 06.6756
40	15.8816	40	16.7030
50	25.9090	50	26.7303
9 44 00	35.9363	9 49 00	36.7577
10	45.9637	10	46.7851
20	55.9911	20	56.8125
30	9 46 06.0185	30	9 51 06.8398
40	16.0459	40	16.8672
50	26.0732	50	26.8946

Sidereal.	Solar.	Sidereal.	Solar.
9 40 00	9 38 24.9809	9 45 00	9 43 24.1618
10	34.9536	10	34.1345
20	44.9263	20	44.1072
30	54.8990	30	54.0799
40	9 39 04.8717	40	9 44 04.0526
50	14.8444	50	14.0253
9 41 00	24.8171	9 46 00	23.9980
10	34.7898	10	33.9707
20	44.7625	20	43.9434
30	54.7352	30	53.9160
40	9 40 04.7079	40	9 45 03.8887
50	14.6806	50	13.8614
9 42 00	24.6533	9 47 00	23.8341
10	34.6260	10	33.8068
20	44.5987	20	43.7795
30	54.5714	30	53.7522
40	9 41 04.5440	40	9 46 03.7249
50	14.5167	50	13.6976
9 43 00	24.4894	9 48 00	23.6703
10	34.4621	10	33.6430
20	44.4348	20	43.6157
30	54.4075	30	53.5884
40	9 42 04.3802	40	9 47 03.5611
50	14.3529	50	13.5338
9 44 00	24.3256	9 49 00	23.5065
10	34.2983	10	33.4792
20	44.2710	20	43.4519
30	54.2437	30	53.4246
40	9 43 04.2164	40	9 48 03.3973
50	14.1891	50	13.3700

Solar.	Sidereal.	Solar.	Sidereal.
9 50 00	9 51 36.9220	9 55 00	9 56 37.7434
10	46.9494	10	47.7707
20	56.9767	20	57.7981
30	9 52 07.0041	30	9 57 07.8255
40	17.0315	40	17.8529
50	27.0589	50	27.8803
9 51 00	37.0863	9 56 00	37.9076
10	47.1136	10	47.9350
20	57.1410	20	57.9624
30	9 53 07.1684	30	9 58 07.9898
40	17.1958	40	18.0171
50	27.2232	50	28.0445
9 52 00	37.2505	9 57 00	38.0719
10	47.2779	10	48.0993
20	57.3053	20	58.1267
30	9 54 07.3327	30	9 59 08.1540
40	17.3600	40	18.1814
50	27.3874	50	28.2088
9 53 00	37.4148	9 58 00	38.2362
10	47.4422	10	48.2636
20	57.4696	20	58.2909
30	9 55 07.4969	30	10 00 08.3183
40	17.5243	40	18.3457
50	27.5517	50	28.3731
9 54 00	37.5791	9 59 00	38.4005
10	47.6065	10	48.4278
20	57.6338	20	58.4552
30	9 56 07.6612	30	10 01 08.4826
40	17.6886	40	18.5100
50	27.7160	50	28.5373

Sidereal.	Solar.	Sidereal.	Solar.
9 50 00	9 48 23.3427	9 55 00	9 53 22.5235
10	33.3154	10	32.4962
20	43.2880	20	42.4689
30	53.2607	30	52.4416
40	9 49 03.2334	40	9 54 02.4143
50	13.2061	50	12.3870
9 51 00	23.1788	9 56 00	22.3597
10	33.1515	10	32.3324
20	43.1242	20	42.3051
30	53.0969	30	52.2778
40	9 50 03.0696	40	9 55 02.2505
50	13.0423	50	12.2232
9 52 00	23.0150	9 57 00	22.1959
10	32.9877	10	32.1686
20	42.9604	20	42.1413
30	52.9331	30	52.1140
40	9 51 02.9058	40	9 56 02.0867
50	12.8785	50	12.0594
9 53 00	22.8512	9 58 00	22.0320
10	32.8239	10	32.0047
20	42.7966	20	41.9774
30	52.7693	30	51.9501
40	9 52 02.7420	40	9 57 01.9228
50	12.7147	50	11.8955
9 54 00	22.6874	9 59 00	21.8682
10	32.6600	10	31.8409
20	42.6327	20	41.8136
30	52.6054	30	51.7863
40	9 53 02.5781	40	9 58 01.7590
50	12.5508	50	11.7317

Solar.	Sidereal.	Solar.	Sidereal.
10 00 00	10 01 38.5647	10 05 00	10 06 39.3861
10	48.5921	10	49.4135
20	58.6195	20	59.4409
30	10 02 08.6469	30	10 07 09.4682
40	18.6742	40	19.4956
50	28.7016	50	29.5230
10 01 00	38.7290	10 06 00	39.5504
10	48.7564	10	49.5778
20	58.7838	20	59.6051
30	10 03 08.8111	30	10 08 09.6325
40	18.8385	40	19.6599
50	28.8659	50	29.6873
10 02 00	38.8933	10 07 00	39.7147
10	48.9207	10	49.7420
20	58.9480	20	59.7694
30	10 04 08.9754	30	10 09 09.7968
40	19.0028	40	19.8242
50	29.0302	50	29.8515
10 03 00	39.0576	10 08 00	39.8789
10	49.0849	10	49.9063
20	59.1123	20	59.9337
30	10 05 09.1397	30	10 10 09.9611
40	19.1671	40	19.9884
50	29.1944	50	30.0158
10 04 00	39.2218	10 09 00	40.0432
10	49.2492	10	50.0706
20	59.2766	20	10 11 00.0980
30	10 06 09.3040	30	10.1253
40	19.3313	40	20.1527
50	29.3587	50	30.1801

Sidereal.	Solar.	Sidereal.	Solar.
10 00 00	9 58 21.7044	10 05 00	10 03 20.8853
10	31.6771	10	30.8580
20	41.6498	20	40.8307
30	51.6225	30	50.8034
40	9 59 01.5952	40	10 04 00.7760
50	11.5679	50	10.7487
10 01 00	21.5406	10 06 00	20.7214
10	31.5133	10	30.6941
20	41.4860	20	40.6668
30	51.4587	30	50.6395
40	10 00 01.4314	40	10 05 00.6122
50	11.4040	50	10.5849
10 02 00	21.3767	10 07 00	20.5576
10	31.3494	10	30.5303
20	41.3221	20	40.5030
30	51.2948	30	50.4757
40	10 01 01.2675	40	10 06 00.4484
50	11.2402	50	10.4211
10 03 00	21.2129	10 08 00	20.3938
10	31.1856	10	30.3665
20	41.1583	20	40.3392
30	51.1310	30	50.3119
40	10 02 01.1037	40	10 07 00.2846
50	11.0764	50	10.2573
10 04 00	21.0491	10 09 00	20.2300
10	31.0218	10	30.2027
20	40.9945	20	40.1754
30	50.9672	30	50.1480
40	10 03 00.9399	40	10 08 00.1207
50	10.9126	50	10.0934

Solar.	Sidereal.	Solar.	Sidereal.
10 10 00	10 11 40.2075	10 15 00	10 16 41.0288
10	50.2349	10	51.0562
20	10 12 00.2622	20	10 17 01.0836
30	10.2896	30	11.1110
40	20.3170	40	21.1384
50	30.3444	50	31.1657
10 11 00	40.3717	10 16 00	41.1931
10	50.3991	10	51.2205
20	10 13 00.4265	20	10 18 01.2479
30	10.4539	30	11.2753
40	20.4813	40	21.3026
50	30.5086	50	31.3300
10 12 00	40.5360	10 17 00	41.3574
10	50.5634	10	51.3848
20	10 14 00.5908	20	10 19 01.4122
30	10.6182	30	11.4395
40	20.6455	40	21.4669
50	30.6729	50	31.4943
10 13 00	40.7003	10 18 00	41.5217
10	50.7277	10	51.5490
20	10 15 00.7551	20	10 20 01.5764
30	10.7824	30	11.6038
40	20.8098	40	21.6312
50	30.8372	50	31.6586
10 14 00	40.8646	10 19 00	41.6859
10	50.8920	10	51.7133
20	10 16 00.9193	20	10 21 01.7407
30	10.9467	30	11.7681
40	20.9741	40	21.7955
50	31.0015	50	31.8228



Sidereal.	Solar.	Sidereal.	Solar.
10 10 00	10 08 20.0661	10 15 00	10 13 19.2470
10	30.0388	10	29.2197
20	40.0115	20	39.1924
30	49.9842	30	49.1651
40	59.9569	40	59.1378
50	10 09 09.9296	50	10 14 09.1105
10 11 00	19.9023	10 16 00	19.0832
10	29.8750	10	29.0559
20	39.8477	20	39.0286
30	49.8204	30	49.0013
40	59.7931	40	58.9740
50	10 10 09.7658	50	10 15 08.9467
10 12 00	19.7385	10 17 00	18.9194
10	29.7112	10	28.8920
20	39.6839	20	38.8647
30	49.6566	30	48.8374
40	59.6293	40	58.8101
50	10 11 09.6020	50	10 16 08.7828
10 13 00	19.5747	10 18 00	18.7555
10	29.5474	10	28.7282
20	39.5200	20	38.7009
30	49.4927	30	48.6736
40	59.4654	40	58.6463
50	10 12 09.4381	50	10 17 08.6190
10 14 00	19.4108	10 19 00	18.5917
10	29.3835	10	28.5644
20	39.3562	20	38.5371
30	49.3289	30	48.5098
40	59.3016	40	58.4825
50	10 13 09.2743	50	10 18 08.4552

Solar.	Sidereal.	Solar.	Sidereal.
10 20 00	10 21 41.8502	10 25 00	10 26 42.6716
10	51.8776	10	52.6990
20	10 22 01.9050	20	10 27 02.7264
30	11.9324	30	12.7537
40	21.9597	40	22.7811
50	31.9871	50	32.8085
10 21 00	42.0145	10 26 00	42.8359
10	52.0419	10	52.8632
20	10 23 02.0693	20	10 28 02.8906
30	12.0966	30	12.9180
40	22.1240	40	22.9454
50	32.1514	50	32.9728
10 22 00	42.1788	10 27 00	43.0001
10	52.2061	10	53.0275
20	10 24 02.2335	20	10 29 03.0549
30	12.2609	30	13.0823
40	22.2883	40	23.1097
50	32.3157	50	33.1370
10 23 00	42.3430	10 28 00	43.1644
10	52.3704	10	53.1918
20	10 25 02.3978	20	10 30 03.2192
30	12.4252	30	13.2466
40	22.4526	40	23.2739
50	32.4799	50	33.3013
10 24 00	42.5073	10 29 00	43.3287
10	52.5347	10	53.3561
20	10 26 02.5621	20	10 31 03.3834
30	12.5895	30	13.4108
40	22.6168	40	23.4382
50	32.6442	50	33.4656

Sidereal.	Solar.	Sidereal.	Solar.
10 20 00	10 18 18.4279	10 25 00	10 23 17.6087
10	28.4006	10	27.5814
20	38.3733	20	37.5541
30	48.3460	30	47.5268
40	58.3187	40	57.4995
50	10 19 08.2914	50	10 24 07.4722
10 21 00	18.2640	10 26 00	17.4449
10	28.2367	10	27.4176
20	38.2094	20	37.3903
30	48.1821	30	47.3630
40	58.1548	40	57.3357
50	10 20 08.1275	50	10 25 07.3084
10 22 00	18.1002	10 27 00	17.2811
10	28.0729	10	27.2538
20	38.0456	20	37.2265
30	48.0183	30	47.1992
40	57.9910	40	57.1719
50	10 21 07.9637	50	10 26 07.1446
10 23 00	17.9364	10 28 00	17.1173
10	27.9091	10	27.0900
20	37.8818	20	37.0627
30	47.8545	30	47.0354
40	57.8272	40	57.0081
50	10 22 07.7999	50	10 27 06.9807
10 24 00	17.7726	10 29 00	16.9534
10	27.7453	10	26.9261
20	37.7180	20	36.8988
30	47.6907	30	46.8715
40	57.6634	40	56.8442
50	10 23 07.6360	50	10 28 06.8169

Solar.	Sidereal.	Solar.	Sidereal.
10 30 00	10 31 43.4930	10 35 00	10 36 44.3143
10	53.5203	10	54.3417
20	10 32 03.5477	20	10 37 04.3691
30	13.5751	30	14.3965
40	23.6025	40	24.4239
50	33.6299	50	34.4512
10 31 00	43.6572	10 36 00	44.4786
10	53.6846	10	54.5060
20	10 33 03.7120	20	10 38 04.5334
30	13.7394	30	14.5607
40	23.7668	40	24.5881
50	33.7941	50	34.6155
10 32 00	43.8215	10 37 00	44.6429
10	53.8489	10	54.6703
20	10 34 03.8763	20	10 39 04.6976
30	13.9037	30	14.7250
40	23.9310	40	24.7524
50	33.9584	50	34.7798
10 33 00	43.9858	10 38 00	44.8072
10	54.0132	10	54.8345
20	10 35 04.0405	20	10 40 04.8619
30	14.0679	30	14.8893
40	24.0953	40	24.9167
50	34.1227	50	34.9441
10 34 00	44.1501	10 39 00	44.9714
10	54.1774	10	54.9988
20	10 36 04.2048	20	10 41 05.0262
30	14.2322	30	15.0536
40	24.2596	40	25.0810
50	34.2870	50	35.1083

Sidereal.	Solar.	Sidereal.	Solar.
10 30 00	10 28 16.7896	10 35 00	10 33 15.9705
10	26.7623	10	25.9432
20	36.7350	20	35.9159
30	46.7077	30	45.8886
40	56.6804	40	55.8613
50	10 29 06.6531	50	10 34 05.8340
10 31 00	16.6258	10 36 00	15.8067
10	26.5985	10	25.7794
20	36.5712	20	35.7521
30	46.5439	30	45.7247
40	56.5166	40	55.6974
50	10 30 06.4893	50	10 35 05.6701
10 32 00	16.4620	10 37 00	15.6428
10	26.4347	10	25.6155
20	36.4074	20	35.5882
30	46.3801	30	45.5609
40	56.3527	40	55.5336
50	10 31 06.3254	50	10 36 05.5063
10 33 00	16.2981	10 38 00	15.4790
10	26.2708	10	25.4517
20	36.2435	20	35.4244
30	46.2162	30	45.3971
40	56.1889	40	55.3698
50	10 32 06.1616	50	10 37 05.3425
10 34 00	16.1343	10 39 00	15.3152
10	26.1070	10	25.2879
20	36.0797	20	35.2606
30	46.0524	30	45.2333
40	56.0251	40	55.2060
50	10 33 05.9978	50	10 38 05.1787

Solar.	Sidereal.	Solar.	Sidereal.
10 40 00	10 41 45.1357	10 45 00	10 46 45.9571
10	55.1631	10	55.9845
20	10 42 05.1905	20	10 47 06.0118
30	15.2178	30	16.0392
40	25.2452	40	26.0666
50	35.2726	50	36.0940
10 41 00	45.3000	10 46 00	46.1214
10	55.3274	10	56.1487
20	10 43 05.3547	20	10 48 06.1761
30	15.3821	30	16.2035
40	25.4095	40	26.2309
50	35.4369	50	36.2583
10 42 00	45.4643	10 47 00	46.2856
10	55.4916	10	56.3130
20	10 44 05.5190	20	10 49 06.3404
30	15.5464	30	16.3678
40	25.5738	40	26.3951
50	35.6012	50	36.4225
10 43 00	45.6285	10 48 00	46.4499
10	55.6559	10	56.4773
20	10 45 05.6833	20	10 50 06.5047
30	15.7107	30	16.5320
40	25.7381	40	26.5594
50	35.7654	50	36.5868
10 44 00	45.7928	10 49 00	46.6142
10	55.8202	10	56.6416
20	10 46 05.8476	20	10 51 06.6689
30	15.8749	30	16.6963
40	25.9023	40	26.7237
50	35.9297	50	36.7511

Sidereal.	Solar.	Sidereal.	Solar.
10 40 00	10 38 15.1514	10 45 00	10 43 14.3322
10	25.1241	10	24.3049
20	35.0967	20	34.2776
30	45.0694	30	44.2503
40	55.0421	40	54.2230
50	10 39 05.0148	50	10 44 04.1957
10 41 00	14.9875	10 46 00	14.1684
10	24.9602	10	24.1411
20	34.9329	20	34.1138
30	44.9056	30	44.0865
40	54.8783	40	54.0592
50	10 40 04.8510	50	10 45 04.0319
10 42 00	14.8237	10 47 00	14.0046
10	24.7964	10	23.9773
20	34.7691	20	33.9500
30	44.7418	30	43.9227
40	54.7145	40	53.8954
50	10 41 04.6872	50	10 46 03.8681
10 43 00	14.6599	10 48 00	13.8407
10	24.6326	10	23.8134
20	34.6053	20	33.7861
30	44.5780	30	43.7588
40	54.5507	40	53.7315
50	10 42 04.5234	50	10 47 03.7042
10 44 00	14.4961	10 49 00	13.6769
10	24.4687	10	23.6496
20	34.4414	20	33.6223
30	44.4141	30	43.5950
40	54.3868	40	53.5677
50	10 43 04.3595	50	10 48 03.5404

Solar.	Sidereal.	Solar.	Sidereal.
10 50 00	10 51 46.7785	10 55 00	10 56 47.5998
10	56.8058	10	57.6272
20	10 52 06.8332	20	10 57 07.6546
30	16.8606	30	17.6820
40	26.8880	40	27.7093
50	36.9154	50	37.7367
10 51 00	46.9427	10 56 00	47.7641
10	56.9701	10	57.7915
20	10 53 06.9975	20	10 58 07.8189
30	17.0249	30	17.8462
40	27.0522	40	27.8736
50	37.0796	50	37.9010
10 52 00	47.1070	10 57 00	47.9284
10	57.1344	10	57.9558
20	10 54 07.1618	20	10 59 07.9831
30	17.1891	30	18.0105
40	27.2165	40	28.0379
50	37.2439	50	38.0653
10 53 00	47.2713	10 58 00	48.0927
10	57.2987	10	58.1200
20	10 55 07.3260	20	11 00 08.1474
30	17.3534	30	18.1748
40	27.3808	40	28.2022
50	37.4082	50	38.2295
10 54 00	47.4356	10 59 00	48.2569
10	57.4629	10	58.2843
20	10 56 07.4903	20	11 01 08.3117
30	17.5177	30	18.3391
40	27.5451	40	28.3664
50	37.5724	50	38.3938



Sidereal.	Solar.	Sidereal.	Solar.
10 50 00	10 48 13.5131	10 55 00	10 53 12.6940
10	23.4858	10	22.6667
20	33.4585	20	32.6394
30	43.4312	30	42.6121
40	53.4039	40	52.5847
50	10 49 03.3766	50	10 54 02.5574
10 51 00	13.3493	10 56 00	12.5301
10	23.3220	10	22.5028
20	33.2947	20	32.4755
30	43.2674	30	42.4482
40	53.2401	40	52.4209
50	10 50 03.2127	50	10 55 02.3936
10 52 00	13.1854	10 57 00	12.3663
10	23.1581	10	22.3390
20	33.1308	20	32.3117
30	43.1035	30	42.2844
40	53.0762	40	52.2571
50	10 51 03.0489	50	10 56 02.2298
10 53 00	13.0216	10 58 00	12.2025
10	22.9943	10	22.1752
20	32.9670	20	32.1479
30	42.9397	30	42.1206
40	52.9124	40	52.0933
50	10 52 02.8851	50	10 57 02.0660
10 54 00	12.8578	10 59 00	12.0387
10	22.8305	10	22.0114
20	32.8032	20	31.9841
30	42.7759	30	41.9567
40	52.7486	40	51.9294
50	10 53 02.7213	50	10 58 01.9021

Solar.	Sidereal.	Solar.	Sidereal.
11 00 00	11 01 48.4212	11 05 00	11 06 49.2426
10	58.4486	10	59.2700
20	11 02 08.4760	20	11 07 09.2973
30	18.5033	30	19.3247
40	28.5307	40	29.3521
50	38.5581	50	39.3795
11 01 00	48.5855	11 06 00	49.4068
10	58.6129	10	59.4342
20	11 03 08.6402	20	11 08 09.4616
30	18.6676	30	19.4890
40	28.6950	40	29.5164
50	38.7224	50	39.5437
11 02 00	48.7498	11 07 00	49.5711
10	58.7771	10	59.5985
20	11 04 08.8045	20	11 09 09.6259
30	18.8319	30	19.6533
40	28.8593	40	29.6806
50	38.8866	50	39.7080
11 03 00	48.9140	11 08 00	49.7354
10	58.9414	10	59.7628
20	11 05 08.9688	20	11 10 09.7902
30	18.9962	30	19.8175
40	29.0235	40	29.8449
50	39.0509	50	39.8723
11 04 00	49.0783	11 09 00	49.8997
10	59.1057	10	59.9271
20	11 06 09.1331	20	11 11 09.9544
30	19.1604	30	19.9818
40	29.1878	40	30.0092
50	39.2152	50	40.0366

Sidereal.	Solar.	Sidereal.	Solar.
11 00 00	10 58 11.8748	11 05 00	11 03 11.0557
10	21.8475	10	21.0284
20	31.8202	20	31.0011
30	41.7929	30	40.9738
40	51.7656	40	50.9465
50	10 59 01.7383	50	11 04 00.9192
11 01 00	11.7110	11 06 00	10.8919
10	21.6837	10	20.8646
20	31.6564	20	30.8373
30	41.6291	30	40.8100
40	51.6018	40	50.7827
50	11 00 01.5745	50	11 05 00.7554
11 02 00	11.5472	11 07 00	10.7281
10	21.5199	10	20.7007
20	31.4926	20	30.6734
30	41.4653	30	40.6461
40	51.4380	40	50.6188
50	11 01 01.4107	50	11 06 00.5915
11 03 00	11.3834	11 08 00	10.5642
10	21.3561	10	20.5369
20	31.3287	20	30.5096
30	41.3014	30	40.4823
40	51.2741	40	50.4550
50	11 02 01.2468	50	11 07 00.4277
11 04 00	11.2195	11 09 00	10.4004
10	21.1922	10	20.3731
20	31.1649	20	30.3458
30	41.1376	30	40.3185
40	51.1103	40	50.2912
50	11 03 01.0830	50	11 08 00.2639

Solar.	Sidereal.	Solar.	Sidereal.
11 10 00	11 11 50.0639	11 15 00	11 16 50.8853
10	11 12 00.0913	10	11 17 00.9127
20	10.1187	20	10.9401
30	20.1461	30	20.9675
40	30.1735	40	30.9948
50	40.2008	50	41.0222
11 11 00	50.2282	11 16 00	51.0496
10	11 13 00.2556	10	11 18 01.0770
20	10.2830	20	11.1044
30	20.3104	30	21.1317
40	30.3377	40	31.1591
50	40.3651	50	41.1865
11 12 00	50.3925	11 17 00	51.2139
10	11 14 00.4199	10	11 19 01.2412
20	10.4473	20	11.2686
30	20.4746	30	21.2960
40	30.5020	40	31.3234
50	40.5294	50	41.3508
11 13 00	50.5568	11 18 00	51.3781
10	11 15 00.5841	10	11 20 01.4055
20	10.6115	20	11.4329
30	20.6389	30	21.4603
40	30.6663	40	31.4877
50	40.6937	50	41.5150
11 14 00	50.7210	11 19 00	51.5424
10	11 16 00.7484	10	11 21 01.5698
20	10.7758	20	11.5972
30	20.8032	30	21.6246
40	30.8306	40	31.6519
50	40.8579	50	41.6793

Sidereal.	Solar.	Sidereal.	Solar.
11 10 00	11 08 10.2366	11 15 00	11 13 09.4174
10	20.2093	10	19.3901
20	30.1820	20	29.3628
30	40.1547	30	39.3355
40	50.1274	40	49.3082
50	11 09 00.1001	50	59.2809
11 11 00	10.0727	11 16 00	11 14 09.2536
10	20.0454	10	19.2263
20	30.0181	20	29.1990
30	39.9908	30	39.1717
40	49.9635	40	49.1444
50	59.9362	50	59.1171
11 12 00	11 10 09.9089	11 17 00	11 15 09.0898
10	19.8816	10	19.0625
20	29.8543	20	29.0352
30	39.8270	30	39.0079
40	49.7997	40	48.9806
50	59.7724	50	58.9533
11 13 00	11 11 09.7451	11 18 00	11 16 08.9260
10	19.7178	10	18.8987
20	29.6905	20	28.8714
30	39.6632	30	38.8441
40	49.6359	40	48.8167
50	59.6086	50	58.7894
11 14 00	11 12 09.5813	11 19 00	11 17 08.7621
10	19.5540	10	18.7348
20	29.5267	20	28.7075
30	39.4994	30	38.6802
40	49.4721	40	48.6529
50	59.4447	50	58.6256

Solar.	Sidereal.	Solar.	Sidereal.
11 20 00	11 21 51.7067	11 25 00	11 26 52.5281
10	11 22 01.7341	10	11 27 02.5554
20	11.7615	20	12.5828
30	21.7888	30	22.6102
40	31.8162	40	32.6376
50	41.8436	50	42.6650
11 21 00	51.8710	11 26 00	52.6923
10	11 23 01.8983	10	11 28 02.7197
20	11.9257	20	12.7471
30	21.9531	30	22.7745
40	31.9805	40	32.8019
50	42.0079	50	42.8292
11 22 00	52.0352	11 27 00	52.8566
10	11 24 02.0626	10	11 29 02.8840
20	12.0900	20	12.9114
30	22.1174	30	22.9388
40	32.1448	40	32.9661
50	42.1721	50	42.9935
11 23 00	52.1995	11 28 00	53.0209
10	11 25 02.2269	10	11 30 03.0483
20	12.2543	20	13.0756
30	22.2817	30	23.1030
40	32.3090	40	33.1304
50	42.3364	50	43.1578
11 24 00	52.3638	11 29 00	53.1852
10	11 26 02.3912	10	11 31 03.2125
20	12.4185	20	13.2399
30	22.4459	30	23.2673
40	32.4733	40	33.2947
50	42.5007	50	43.3221

Sidereal.	Solar.	Sidereal.	Solar.
11 20 00	11 18 08.5983	11 25 00	11 23 07.7792
10	18.5710	10	17.7519
20	28.5437	20	27.7246
30	38.5164	30	37.6973
40	48.4891	40	47.6700
50	58.4618	50	57.6427
11 21 00	11 19 08.4345	11 26 00	11 24 07.6154
10	18.4072	10	17.5881
20	28.3799	20	27.5608
30	38.3526	30	37.5334
40	48.3253	40	47.5061
50	58.2980	50	57.4788
11 22 00	11 20 08.2707	11 27 00	11 25 07.4515
10	18.2434	10	17.4242
20	28.2161	20	27.3969
30	38.1888	30	37.3696
40	48.1614	40	47.3423
50	58.1341	50	57.3150
11 23 00	11 21 08.1068	11 28 00	11 26 07.2877
10	18.0795	10	17.2604
20	28.0522	20	27.2331
30	38.0249	30	37.2058
40	47.9976	40	47.1785
50	57.9703	50	57.1512
11 24 00	11 22 07.9430	11 29 00	11 27 07.1239
10	17.9157	10	17.0966
20	27.8884	20	27.0693
30	37.8611	30	37.0420
40	47.8338	40	47.0147
50	57.8065	50	56.9874

Solar.	Sidereal.	Solar.	Sidereal.
11 30 00	11 31 53.3494	11 35 00	11 36 54.1708
10	11 32 03.3768	10	11 37 04.1982
20	13.4042	20	14.2256
30	23.4316	30	24.2529
40	33.4590	40	34.2803
50	43.4863	50	44.3077
11 31 00	53.5137	11 36 00	54.3351
10	11 33 03.5411	10	11 38 04.3625
20	13.5685	20	14.3898
30	23.5958	30	24.4172
40	33.6232	40	34.4446
50	43.6506	50	44.4720
11 32 00	53.6780	11 37 00	54.4994
10	11 34 03.7054	10	11 39 04.5267
20	13.7327	20	14.5541
30	23.7601	30	24.5815
40	33.7875	40	34.6089
50	43.8149	50	44.6363
11 33 00	53.8423	11 38 00	54.6636
10	11 35 03.8696	10	11 40 04.6910
20	13.8970	20	14.7184
30	23.9244	30	24.7458
40	33.9518	40	34.7732
50	43.9792	50	44.8005
11 34 00	54.0065	11 39 00	54.8279
10	11 36 04.0339	10	11 41 04.8553
20	14.0613	20	14.8827
30	24.0887	30	24.9100
40	34.1161	40	34.9374
50	44.1434	50	44.9648



Sidereal.	Solar.	Sidereal.	Solar.
11 30 00	11 28 06.9601	11 35 00	11 33 06.1409
10	16.9328	10	16.1136
20	26.9054	20	26.0863
30	36.8781	30	36.0590
40	46.8508	40	46.0317
50	56.8235	50	56.0044
11 31 00	11 29 06.7962	11 36 00	11 34 05.9771
10	16.7689	10	15.9498
20	26.7416	20	25.9225
30	36.7143	30	35.8952
40	46.6870	40	45.8679
50	56.6597	50	55.8406
11 32 00	11 30 06.6324	11 37 00	11 35 05.8133
10	16.6051	10	15.7860
20	26.5778	20	25.7587
30	36.5505	30	35.7314
40	46.5232	40	45.7041
50	56.4959	50	55.6768
11 33 00	11 31 06.4686	11 38 00	11 36 05.6494
10	16.4413	10	15.6221
20	26.4140	20	25.5948
30	36.3867	30	35.5675
40	46.3594	40	45.5402
50	56.3321	50	55.5129
11 34 00	11 32 06.3048	11 39 00	11 37 05.4856
10	16.2774	10	15.4583
20	26.2501	20	25.4310
30	36.2228	30	35.4037
40	46.1955	40	45.3764
50	56.1682	50	55.3491

Solar.	Sidereal.	Solar.	Sidereal.
11 40 00	11 41 54.9922	11 45 00	11 46 55.8136
10	11 42 05.0196	10	11 47 05.8409
20	15.0469	20	15.8683
30	25.0743	30	25.8957
40	35.1017	40	35.9231
50	45.1291	50	45.9505
11 41 00	55.1565	11 46 00	55.9778
10	11 43 05.1838	10	11 48 06.0052
20	15.2112	20	16.0326
30	25.2386	30	26.0600
40	35.2660	40	36.0873
50	45.2934	50	46.1147
11 42 00	55.3207	11 47 00	56.1421
10	11 44 05.3481	10	11 49 06.1695
20	15.3755	20	16.1969
30	25.4029	30	26.2242
40	35.4302	40	36.2516
50	45.4576	50	46.2790
11 43 00	55.4850	11 48 00	56.3064
10	11 45 05.5124	10	11 50 06.3338
20	15.5398	20	16.3611
30	25.5671	30	26.3885
40	35.5945	40	36.4159
50	45.6219	50	46.4433
11 44 00	55.6493	11 49 00	56.4707
10	11 46 05.6767	10	11 51 06.4980
20	15.7040	20	16.5254
30	25.7314	30	26.5528
40	35.7588	40	36.5802
50	45.7862	50	46.6075

Sidereal.	Solar.	Sidereal.	Solar.
11 40 00	11 38 05.3218	11 45 00	11 43 04.5027
10	15.2945	10	14.4754
20	25.2672	20	24.4481
30	35.2399	30	34.4208
40	45.2126	40	44.3934
50	55.1853	50	54.3661
11 41 00	11 39 05.1580	11 46 00	11 44 04.3388
10	15.1307	10	14.3115
20	25.1034	20	24.2842
30	35.0761	30	34.2569
40	45.0488	40	44.2296
50	55.0214	50	54.2023
11 42 00	11 40 04.9941	11 47 00	11 45 04.1750
10	14.9668	10	14.1477
20	24.9395	20	24.1204
30	34.9122	30	34.0931
40	44.8849	40	44.0658
50	54.8576	50	54.0385
11 43 00	11 41 04.8303	11 48 00	11 46 04.0112
10	14.8030	10	13.9839
20	24.7757	20	23.9566
30	34.7484	30	33.9293
40	44.7211	40	43.9020
50	54.6938	50	53.8747
11 44 00	11 42 04.6665	11 49 00	11 47 03.8474
10	14.6392	10	13.8201
20	24.6119	20	23.7928
30	34.5846	30	33.7654
40	44.5573	40	43.7381
50	54.5300	50	53.7108

Solar.	Sidereal.	Solar.	Sidereal.
11 50 00	11 51 56.6349	11 55 00	11 56 57.4563
10	11 52 06.6623	10	11 57 07.4837
20	16.6897	20	17.5111
30	26.7171	30	27.5384
40	36.7444	40	37.5658
50	46.7718	50	47.5932
11 51 00	56.7992	11 56 00	57.6206
10	11 53 06.8266	10	11 58 07.6480
20	16.8540	20	17.6753
30	26.8813	30	27.7027
40	36.9087	40	37.7301
50	46.9361	50	47.7575
11 52 00	56.9635	11 57 00	57.7849
10	11 54 06.9909	10	11 59 07.8122
20	17.0182	20	17.8396
30	27.0456	30	27.8670
40	37.0730	40	37.8944
50	47.1004	50	47.9217
11 53 00	57.1278	11 58 00	57.9491
10	11 55 07.1551	10	12 00 07.9765
20	17.1825	20	18.0039
30	27.2099	30	28.0313
40	37.2373	40	38.0586
50	47.2646	50	48.0860
11 54 00	57.2920	11 59 00	58.1134
10	11 56 07.3194	10	12 01 08.1408
20	17.3468	20	18.1682
30	27.3742	30	28.1955
40	37.4015	40	38.2229
50	47.4289	50	48.2503

Sidereal.	Solar.	Sidereal.	Solar.
11 50 00	11 48 03.6835	11 55 00	11 53 02.8644
10	13.6562	10	12.8371
20	23.6289	20	22.8098
30	33.6016	30	32.7825
40	43.5743	40	42.7552
50	53.5470	50	52.7279
11 51 00	11 49 03.5197	11 56 00	11 54 02.7006
10	13.4924	10	12.6733
20	23.4651	20	22.6460
30	33.4378	30	32.6187
40	43.4105	40	42.5914
50	53.3832	50	52.5641
11 52 00	11 50 03.3559	11 57 00	11 55 02.5368
10	13.3286	10	12.5094
20	23.3013	20	22.4821
30	33.2740	30	32.4548
40	43.2467	40	42.4275
50	53.2194	50	52.4002
11 53 00	11 51 03.1921	11 58 00	11 56 02.3729
10	13.1648	10	12.3456
20	23.1374	20	22.3183
30	33.1101	30	32.2910
40	43.0828	40	42.2637
50	53.0555	50	52.2364
11 54 00	11 52 03.0282	11 59 00	11 57 02.2091
10	13.0009	10	12.1818
20	22.9736	20	22.1545
30	32.9463	30	32.1272
40	42.9190	40	42.0999
50	52.8917	50	52.0726

Solar.	Sidereal.	Solar.	Sidereal.
12 00 00	12 01 58.2777	12 05 00	12 06 59.0990
10	12 02 08.3051	10	12 07 09.1264
20	18.3324	20	19.1538
30	28.3598	30	29.1812
40	38.3872	40	39.2086
50	48.4146	50	49.2359
12 01 00	58.4419	12 06 00	59.2633
10	12 03 08.4693	10	12 08 09.2907
20	18.4967	20	19.3181
30	28.5241	30	29.3455
40	38.5515	40	39.3728
50	48.5788	50	49.4002
12 02 00	58.6062	12 07 00	59.4276
10	12 04 08.6336	10	12 09 09.4550
20	18.6610	20	19.4824
30	28.6884	30	29.5097
40	38.7157	40	39.5371
50	48.7431	50	49.5645
12 03 00	58.7705	12 08 00	59.5919
10	12 05 08.7979	10	12 10 09.6192
20	18.8253	20	19.6466
30	28.8526	30	29.6740
40	38.8800	40	39.7014
50	48.9074	50	49.7288
12 04 00	58.9348	12 09 00	59.7561
10	12 06 08.9622	10	12 11 09.7835
20	18.9895	20	19.8109
30	29.0169	30	29.8383
40	39.0443	40	39.8657
50	49.0717	50	49.8930

Sidereal.	Solar.	Sidereal.	Solar.
12 00 00	11 58 02.0453	12 05 00	12 03 01.2261
10	12.0180	10	11.1988
20	21.9907	20	21.1715
30	31.9634	30	31.1442
40	41.9361	40	41.1169
50	51.9088	50	51.0896
12 01 00	11 59 01.8814	12 06 00	12 04 01.0623
10	11.8541	10	11.0350
20	21.8268	20	21.0077
30	31.7995	30	30.9804
40	41.7722	40	40.9531
50	51.7449	50	50.9258
12 02 00	12 00 01.7176	12 07 00	12 05 00.8985
10	11.6903	10	10.8712
20	21.6630	20	20.8439
30	31.6357	30	30.8166
40	41.6084	40	40.7893
50	51.5811	50	50.7620
12 03 00	12 01 01.5538	12 08 00	12 06 00.7347
10	11.5265	10	10.7074
20	21.4992	20	20.6801
30	31.4719	30	30.6528
40	41.4446	40	40.6254
50	51.4173	50	50.5981
12 04 00	12 02 01.3900	12 09 00	12 07 00.5708
10	11.3627	10	10.5435
20	21.3354	20	20.5162
30	31.3081	30	30.4889
40	41.2808	40	40.4616
50	51.2534	50	50.4343

Solar.	Sidereal.	Solar.	Sidereal.
12 10 00	12 11 59.9204	12 15 00	12 17 00.7418
10	12 12 09.9478	10	10.7692
20	19.9752	20	20.7966
30	30.0026	30	30.8239
40	40.0299	40	40.8513
50	50.0573	50	50.8787
12 11 00	12 13 00.0847	12 16 00	12 18 00.9061
10	10.1121	10	10.9334
20	20.1395	20	20.9608
30	30.1668	30	30.9882
40	40.1942	40	41.0156
50	50.2216	50	51.0430
12 12 00	12 14 00.2490	12 17 00	12 19 01.0703
10	10.2763	10	11.0977
20	20.3037	20	21.1251
30	30.3311	30	31.1525
40	40.3585	40	41.1799
50	50.3859	50	51.2072
12 13 00	12 15 00.4132	12 18 00	12 20 01.2346
10	10.4406	10	11.2620
20	20.4680	20	21.2894
30	30.4954	30	31.3168
40	40.5228	40	41.3441
50	50.5501	50	51.3715
12 14 00	12 16 00.5775	12 19 00	12 21 01.3989
10	10.6049	10	11.4263
20	20.6323	20	21.4536
30	30.6597	30	31.4810
40	40.6870	40	41.5084
50	50.7144	50	51.5358



Sidereal.	Solar.	Sidereal.	Solar.
12 10 00	12 08 00.4070	12 15 00	12 12 59.5879
10	10.3797	10	12 13 09.5606
20	20.3524	20	19.5333
30	30.3251	30	29.5060
40	40.2978	40	39.4787
50	50.2705	50	49.4514
12 11 00	12 09 00.2432	12 16 00	59.4241
10	10.2159	10	12 14 09.3968
20	20.1886	20	19.3695
30	30.1613	30	29.3421
40	40.1340	40	39.3148
50	50.1067	50	49.2875
12 12 00	12 10 00.0794	12 17 00	59.2602
10	10.0521	10	12 15 09.2329
20	20.0248	20	19.2056
30	29.9974	30	29.1783
40	39.9701	40	39.1510
50	49.9428	50	49.1237
12 13 00	59.9155	12 18 00	59.0964
10	12 11 09.8882	10	12 16 09.0691
20	19.8609	20	19.0418
30	29.8336	30	29.0145
40	39.8063	40	38.9872
50	49.7790	50	48.9599
12 14 00	59.7517	12 19 00	58.9326
10	12 12 09.7244	10	12 17 08.9053
20	19.6971	20	18.8780
30	29.6698	30	28.8507
40	39.6425	40	38.8234
50	49.6152	50	48.7961

Solar.	Sidereal.	Solar.	Sidereal.
12 20 00	12 22 01.5632	12 25 00	12 27 02.3845
10	11.5905	10	12.4119
20	21.6179	20	22.4393
30	31.6453	30	32.4667
40	41.6727	40	42.4941
50	51.7001	50	52.5214
12 21 00	12 23 01.7274	12 26 00	12 28 02.5488
10	11.7548	10	12.5762
20	21.7822	20	22.6036
30	31.8096	30	32.6309
40	41.8370	40	42.6583
50	51.8643	50	52.6857
12 22 00	12 24 01.8917	12 27 00	12 29 02.7131
10	11.9191	10	12.7405
20	21.9465	20	22.7678
30	31.9739	30	32.7952
40	42.0012	40	42.8226
50	52.0286	50	52.8500
12 23 00	12 25 02.0560	12 28 00	12 30 02.8774
10	12.0834	10	12.9047
20	22.1107	20	22.9321
30	32.1381	30	32.9595
40	42.1655	40	42.9869
50	52.1929	50	53.0143
12 24 00	12 26 02.2203	12 29 00	12 31 03.0416
10	12.2476	10	13.0690
20	22.2750	20	23.0964
30	32.3024	30	33.1238
40	42.3298	40	43.1512
50	52.3572	50	53.1785

Sidereal.	Solar.	Sidereal.	Solar.
12 20 00	12 17 58.7688	12 25 00	12 22 57.9496
10	12 18 08.7415	10	12 23 07.9223
20	18.7141	20	17.8950
30	28.6868	30	27.8677
40	38.6595	40	37.8404
50	48.6322	50	47.8131
12 21 00	58.6049	12 26 00	57.7858
10	12 19 08.5776	10	12 24 07.7585
20	18.5503	20	17.7312
30	28.5230	30	27.7039
40	38.4957	40	37.6766
50	48.4684	50	47.6493
12 22 00	58.4411	12 27 00	57.6220
10	12 20 08.4138	10	12 25 07.5947
20	18.3865	20	17.5674
30	28.3592	30	27.5401
40	38.3319	40	37.5128
50	48.3046	50	47.4855
12 23 00	58.2773	12 28 00	57.4581
10	12 21 08.2500	10	12 26 07.4308
20	18.2227	20	17.4035
30	28.1954	30	27.3762
40	38.1681	40	37.3489
50	48.1408	50	47.3216
12 24 00	58.1135	12 29 00	57.2943
10	12 22 08.0861	10	12 27 07.2670
20	18.0588	20	17.2397
30	28.0315	30	27.2124
40	38.0042	40	37.1851
50	47.9769	50	47.1578

Solar.	Sidereal.	Solar.	Sidereal.
12 30 00	12 32 03.2059	12 35 00	12 37 04.0273
10	13.2333	10	14.0547
20	23.2607	20	24.0820
30	33.2880	30	34.1094
40	43.3154	40	44.1368
50	53.3428	50	54.1642
12 31 00	12 33 03.3702	12 36 00	12 38 04.1916
10	13.3976	10	14.2189
20	23.4249	20	24.2463
30	33.4523	30	34.2737
40	43.4797	40	44.3011
50	53.5071	50	54.3285
12 32 00	12 34 03.5345	12 37 00	12 39 04.3558
10	13.5618	10	14.3832
20	23.5892	20	24.4106
30	33.6166	30	34.4380
40	43.6440	40	44.4653
50	53.6714	50	54.4927
12 33 00	12 35 03.6987	12 38 00	12 40 04.5201
10	13.7261	10	14.5475
20	23.7535	20	24.5749
30	33.7809	30	34.6022
40	43.8083	40	44.6296
50	53.8356	50	54.6570
12 34 00	12 36 03.8630	12 39 00	12 41 04.6844
10	13.8904	10	14.7118
20	23.9178	20	24.7391
30	33.9451	30	34.7665
40	43.9725	40	44.7939
50	53.9999	50	54.8213

Sidereal.	Solar.	Sidereal.	Solar.
12 30 00	12 27 57.1305	12 35 00	12 32 56.3114
10	12 28 07.1032	10	12 33 06.2841
20	17.0759	20	16.2568
30	27.0486	30	26.2295
40	37.0213	40	36.2021
50	46.9940	50	46.1748
12 31 00	56.9667	12 36 00	56.1475
10	12 29 06.9394	10	12 34 06.1202
20	16.9121	20	16.0929
30	26.8848	30	26.0656
40	36.8575	40	36.0383
50	46.8301	50	46.0110
12 32 00	56.8028	12 37 00	55.9837
10	12 30 06.7755	10	12 35 05.9564
20	16.7482	20	15.9291
30	26.7209	30	25.9018
40	36.6936	40	35.8745
50	46.6663	50	45.8472
12 33 00	56.6390	12 38 00	55.8199
10	12 31 06.6117	10	12 36 05.7926
20	16.5844	20	15.7653
30	26.5571	30	25.7380
40	36.5298	40	35.7107
50	46.5025	50	45.6834
12 34 00	56.4752	12 39 00	55.6561
10	12 32 06.4479	10	12 37 05.6288
20	16.4206	20	15.6015
30	26.3933	30	25.5741
40	36.3660	40	35.5468
50	46.3387	50	45.5195

Solar.	Sidereal.	Solar.	Sidereal.
12 40 00	12 42 04.8487	12 45 00	12 47 05.6700
10	14.8760	10	15.6974
20	24.9034	20	25.7248
30	34.9308	30	35.7522
40	44.9582	40	45.7795
50	54.9856	50	55.8069
12 41 00	12 43 05.0129	12 46 00	12 48 05.8343
10	15.0403	10	15.8617
20	25.0677	20	25.8891
30	35.0951	30	35.9164
40	45.1224	40	45.9438
50	55.1498	50	55.9712
12 42 00	12 44 05.1772	12 47 00	12 49 05.9986
10	15.2046	10	16.0260
20	25.2320	20	26.0533
30	35.2593	30	36.0807
40	45.2867	40	46.1081
50	55.3141	50	56.1355
12 43 00	12 45 05.3415	12 48 00	12 50 06.1629
10	15.3689	10	16.1902
20	25.3962	20	26.2176
30	35.4236	30	36.2450
40	45.4510	40	46.2724
50	55.4784	50	56.2997
12 44 00	12 46 05.5058	12 49 00	12 51 06.3271
10	15.5331	10	16.3545
20	25.5605	20	26.3819
30	35.5879	30	36.4093
40	45.6153	40	46.4366
50	55.6426	50	56.4640

Sidereal.	Solar.	Sidereal.	Solar.
12 40 00	12 37 55.4922	12 45 00	12 42 54.6731
10	12 38 05.4649	10	12 43 04.6458
20	15.4376	20	14.6185
30	25.4103	30	24.5912
40	35.3830	40	34.5639
50	45.3557	50	44.5366
12 41 00	55.3284	12 46 00	54.5093
10	12 39 05.3011	10	12 44 04.4820
20	15.2738	20	14.4547
30	25.2465	30	24.4274
40	35.2192	40	34.4001
50	45.1919	50	44.3728
12 42 00	55.1646	12 47 00	54.3455
10	12 40 05.1373	10	12 45 04.3181
20	15.1100	20	14.2908
30	25.0827	30	24.2635
40	35.0554	40	34.2362
50	45.0281	50	44.2089
12 43 00	55.0008	12 48 00	54.1816
10	12 41 04.9735	10	12 46 04.1543
20	14.9461	20	14.1270
30	24.9188	30	24.0997
40	34.8915	40	34.0724
50	44.8642	50	44.0451
12 44 00	54.8369	12 49 00	54.0178
10	12 42 04.8096	10	12 47 03.9905
20	14.7823	20	13.9632
30	24.7550	30	23.9359
40	34.7277	40	33.9086
50	44.7004	50	43.8813

Solar.	Sidereal.	Solar.	Sidereal.
12 50 00	12 52 06.4914	12 55 00	12 57 07.3128
10	16.5188	10	17.3402
20	26.5462	20	27.3675
30	36.5735	30	37.3949
40	46.6009	40	47.4223
50	56.6283	50	57.4497
12 51 00	12 53 06.6557	12 56 00	12 58 07.4770
10	16.6831	10	17.5044
20	26.7104	20	27.5318
30	36.7378	30	37.5592
40	46.7652	40	47.5866
50	56.7926	50	57.6139
12 52 00	12 54 06.8200	12 57 00	12 59 07.6413
10	16.8473	10	17.6687
20	26.8747	20	27.6961
30	36.9021	30	37.7235
40	46.9295	40	47.7508
50	56.9568	50	57.7782
12 53 00	12 55 06.9842	12 58 00	13 00 07.8056
10	17.0116	10	17.8330
20	27.0390	20	27.8604
30	37.0664	30	37.8877
40	47.0937	40	47.9151
50	57.1211	50	57.9425
12 54 00	12 56 07.1485	12 59 00	13 01 07.9699
10	17.1759	10	17.9973
20	27.2033	20	28.0246
30	37.2306	30	38.0520
40	47.2580	40	48.0794
50	57.2854	50	58.1068



Sidereal.	Solar.	Sidereal.	Solar.
12 50 00	12 47 53.8540	12 55 00	12 52 53.0348
10	12 48 03.8267	10	12 53 03.0075
20	13.7994	20	12.9802
30	23.7721	30	22.9529
40	33.7448	40	32.9256
50	43.7175	50	42.8983
12 51 00	53.6901	12 56 00	52.8710
10	12 49 03.6628	10	12 54 02.8437
20	13.6355	20	12.8164
30	23.6082	30	22.7891
40	33.5809	40	32.7618
50	43.5536	50	42.7345
12 52 00	53.5263	12 57 00	52.7072
10	12 50 03.4990	10	12 55 02.6799
20	13.4717	20	12.6526
30	23.4444	30	22.6253
40	33.4171	40	32.5980
50	43.3898	50	42.5707
12 53 00	53.3625	12 58 00	52.5434
10	12 51 03.3352	10	12 56 02.5161
20	13.3079	20	12.4888
30	23.2806	30	22.4615
40	33.2533	40	32.4341
50	43.2260	50	42.4068
12 54 00	53.1987	12 59 00	52.3795
10	12 52 03.1714	10	12 57 02.3522
20	13.1441	20	12.3249
30	23.1168	30	22.2976
40	33.0895	40	32.2703
50	43.0621	50	42.2430

Solar.	Sidereal.	Solar.	Sidereal.
13 00 00	13 02 08.1341	13 05 00	13 07 08.9555
10	18.1615	10	18.9829
20	28.1889	20	29.0103
30	38.2163	30	39.0377
40	48.2437	40	49.0650
50	58.2710	50	59.0924
13 01 00	13 03 08.2984	13 06 00	13 08 09.1198
10	18.3258	10	19.1472
20	28.3532	20	29.1746
30	38.3806	30	39.2019
40	48.4079	40	49.2293
50	58.4353	50	59.2567
13 02 00	13 04 08.4627	13 07 00	13 09 09.2841
10	18.4901	10	19.3114
20	28.5175	20	29.3388
30	38.5448	30	39.3662
40	48.5722	40	49.3936
50	58.5996	50	59.4210
13 03 00	13 05 08.6270	13 08 00	13 10 09.4483
10	18.6543	10	19.4757
20	28.6817	20	29.5031
30	38.7091	30	39.5305
40	48.7365	40	49.5579
50	58.7639	50	59.5852
13 04 00	13 06 08.7912	13 09 00	13 11 09.6126
10	18.8186	10	19.6400
20	28.8460	20	29.6674
30	38.8734	30	39.6948
40	48.9008	40	49.7221
50	58.9281	50	59.7495

Sidereal.	Solar.	Sidereal.	Solar.
13 00 00	12 57 52.2157	13 05 00	13 02 51.3966
10	12 58 02.1884	10	13 03 01.3693
20	12.1611	20	11.3420
30	22.1338	30	21.3147
40	32.1065	40	31.2874
50	42.0792	50	41.2601
13 01 00	52.0519	13 06 00	51.2328
10	12 59 02.0246	10	13 04 01.2055
20	11.9973	20	11.1781
30	21.9700	30	21.1508
40	31.9427	40	31.1235
50	41.9154	50	41.0962
13 02 00	51.8881	13 07 00	51.0689
10	13 00 01.8608	10	13 05 01.0416
20	11.8335	20	11.0143
30	21.8061	30	20.9870
40	31.7788	40	30.9597
50	41.7515	50	40.9324
13 03 00	51.7242	13 08 00	50.9051
10	13 01 01.6969	10	13 06 00.8778
20	11.6696	20	10.8505
30	21.6423	30	20.8232
40	31.6150	40	30.7959
50	41.5877	50	40.7686
13 04 00	51.5604	13 09 00	50.7413
10	13 02 01.5331	10	13 07 00.7140
20	11.5058	20	10.6867
30	21.4785	30	20.6594
40	31.4512	40	30.6321
50	41.4239	50	40.6048

Solar.	Sidereal.	Solar.	Sidereal.
13 10 00	13 12 09.7769	13 15 00	13 17 10.5983
10	19.8043	10	20.6256
20	29.8317	20	30.6530
30	39.8590	30	40.6804
40	49.8864	40	50.7078
50	59.9138	50	13 18 00.7352
13 11 00	13 13 09.9412	13 16 00	10.7625
10	19.9685	10	20.7899
20	29.9959	20	30.8173
30	40.0233	30	40.8447
40	50.0507	40	50.8721
50	13 14 00.0781	50	13 19 00.8994
13 12 00	10.1054	13 17 00	10.9268
10	20.1328	10	20.9542
20	30.1602	20	30.9816
30	40.1876	30	41.0090
40	50.2150	40	51.0363
50	13 15 00.2423	50	13 20 01.0637
13 13 00	10.2697	13 18 00	11.0911
10	20.2971	10	21.1185
20	30.3245	20	31.1458
30	40.3519	30	41.1732
40	50.3792	40	51.2006
50	13 16 00.4066	50	13 21 01.2280
13 14 00	10.4340	13 19 00	11.2554
10	20.4614	10	21.2827
20	30.4887	20	31.3101
30	40.5161	30	41.3375
40	50.5435	40	51.3649
50	13 17 00.5709	50	13 22 01.3923

Sidereal.	Solar.	Sidereal.	Solar.
13 10 00	13 07 50.5775	13 15 00	13 12 49.7583
10	13 08 00.5502	10	59.7310
20	10.5228	20	13 13 09.7037
30	20.4955	30	19.6764
40	30.4682	40	29.6491
50	40.4409	50	39.6218
13 11 00	50.4136	13 16 00	49.5945
10	13 09 00.3863	10	59.5672
20	10.3590	20	13 14 09.5399
30	20.3317	30	19.5126
40	30.3044	40	29.4853
50	40.2771	50	39.4580
13 12 00	50.2498	13 17 00	49.4307
10	13 10 00.2225	10	59.4034
20	10.1952	20	13 15 09.3761
30	20.1679	30	19.3488
40	30.1406	40	29.3215
50	40.1133	50	39.2942
13 13 00	50.0860	13 18 00	49.2668
10	13 11 00.0587	10	59.2395
20	10.0314	20	13 16 09.2122
30	20.0041	30	19.1849
40	29.9768	40	29.1576
50	39.9495	50	39.1303
13 14 00	49.9222	13 19 00	49.1030
10	59.8948	10	59.0757
20	13 12 09.8675	20	13 17 09.0484
30	19.8402	30	19.0211
40	29.8129	40	28.9938
50	39.7856	50	38.9665

Solar.	Sidereal.	Solar.	Sidereal.
13 20 00	13 22 11.4196	13 25 00	13 27 12.2410
10	21.4470	10	22.2684
20	31.4744	20	32.2958
30	41.5018	30	42.3231
40	51.5292	40	52.3505
50	13 23 01.5565	50	13 28 02.3779
13 21 00	11.5839	13 26 00	12.4053
10	21.6113	10	22.4327
20	31.6387	20	32.4600
30	41.6660	30	42.4874
40	51.6934	40	52.5148
50	13 24 01.7208	50	13 29 02.5422
13 22 00	11.7482	13 27 00	12.5696
10	21.7756	10	22.5969
20	31.8029	20	32.6243
30	41.8303	30	42.6517
40	51.8577	40	52.6791
50	13 25 01.8851	50	13 30 02.7065
13 23 00	11.9125	13 28 00	12.7338
10	21.9398	10	22.7612
20	31.9672	20	32.7886
30	41.9946	30	42.8160
40	52.0220	40	52.8434
50	13 26 02.0494	50	13 31 02.8707
13 24 00	12.0767	13 29 00	12.8981
10	22.1041	10	22.9255
20	32.1315	20	32.9529
30	42.1589	30	42.9802
40	52.1863	40	53.0076
50	13 27 02.2136	50	13 32 03.0350

Sidereal.	Solar.	Sidereal.	Solar.
13 20 00	13 17 48.9392	13 25 00	13 22 48.1201
10	58.9119	10	58.0928
20	13 18 08.8846	20	13 23 08.0655
30	18.8573	30	18.0382
40	28.8300	40	28.0108
50	38.8027	50	37.9835
13 21 00	48.7754	13 26 00	47.9562
10	58.7481	10	57.9289
20	13 19 08.7208	20	13 24 07.9016
30	18.6935	30	17.8743
40	28.6662	40	27.8470
50	38.6388	50	37.8197
13 22 00	48.6115	13 27 00	47.7924
10	58.5842	10	57.7651
20	13 20 08.5569	20	13 25 07.7378
30	18.5296	30	17.7105
40	28.5023	40	27.6832
50	38.4750	50	37.6559
13 23 00	48.4477	13 28 00	47.6286
10	58.4204	10	57.6013
20	13 21 08.3931	20	13 26 07.5740
30	18.3658	30	17.5467
40	28.3385	40	27.5194
50	38.3112	50	37.4921
13 24 00	48.2839	13 29 00	47.4648
10	58.2566	10	57.4375
20	13 22 08.2293	20	13 27 07.4102
30	18.2020	30	17.3828
40	28.1747	40	27.3555
50	38.1474	50	37.3282

Solar.	Sidereal.	Solar.	Sidereal.
13 30 00	13 32 13.0624	13 35 00	13 37 13.8838
10	23.0898	10	23.9111
20	33.1171	20	33.9385
30	43.1445	30	43.9659
40	53.1719	40	53.9933
50	13 33 03.1993	50	13 38 04.0207
13 31 00	13.2267	13 36 00	14.0480
10	23.2540	10	24.0754
20	33.2814	20	34.1028
30	43.3088	30	44.1302
40	53.3362	40	54.1575
50	13 34 03.3636	50	13 39 04.1849
13 32 00	13.3909	13 37 00	14.2123
10	23.4183	10	24.2397
20	33.4457	20	34.2671
30	43.4731	30	44.2944
40	53.5004	40	54.3218
50	13 35 03.5278	50	13 40 04.3492
13 33 00	13.5552	13 38 00	14.3766
10	23.5826	10	24.4040
20	33.6100	20	34.4313
30	43.6373	30	44.4587
40	53.6647	40	54.4861
50	13 36 03.6921	50	13 41 04.5135
13 34 00	13.7195	13 39 00	14.5409
10	23.7469	10	24.5682
20	33.7742	20	34.5956
30	43.8016	30	44.6230
40	53.8290	40	54.6504
50	13 37 03.8564	50	13 42 04.6778



Sidereal.	Solar.	Sidereal.	Solar.
13 30 00	13 27 47.3009	13 35 00	13 32 46.4818
10	57.2736	10	56.4545
20	13 28 07.2463	20	13 33 06.4272
30	17.2190	30	16.3999
40	27.1917	40	26.3726
50	37.1644	50	36.3453
13 31 00	47.1371	13 36 00	46.3180
10	57.1098	10	56.2907
20	13 29 07.0825	20	13 34 06.2634
30	17.0552	30	16.2361
40	27.0279	40	26.2088
50	37.0006	50	36.1815
13 32 00	46.9733	13 37 00	46.1542
10	56.9460	10	56.1268
20	13 30 06.9187	20	13 35 06.0995
30	16.8914	30	16.0722
40	26.8641	40	26.0449
50	36.8368	50	36.0176
13 33 00	46.8095	13 38 00	45.9903
10	56.7822	10	55.9630
20	13 31 06.7548	20	13 36 05.9357
30	16.7275	30	15.9084
40	26.7002	40	25.8811
50	36.6729	50	35.8538
13 34 00	46.6456	13 39 00	45.8265
10	56.6183	10	55.7992
20	13 32 06.5910	20	13 37 05.7719
30	16.5637	30	15.7446
40	26.5364	40	25.7173
50	36.5091	50	35.6900

Solar.	Sidereal.	Solar.	Sidereal.
13 40 00	13 42 14.7051	13 45 00	13 47 15.5265
10	24.7325	10	25.5539
20	34.7599	20	35.5813
30	44.7873	30	45.6086
40	54.8146	40	55.6360
50	13 43 04.8420	50	13 48 05.6634
13 41 00	14.8694	13 46 00	15.6908
10	24.8968	10	25.7182
20	34.9242	20	35.7455
30	44.9515	30	45.7729
40	54.9789	40	55.8003
50	13 44 05.0063	50	13 49 05.8277
13 42 00	15.0337	13 47 00	15.8551
10	25.0611	10	25.8824
20	35.0884	20	35.9098
30	45.1158	30	45.9372
40	55.1432	40	55.9646
50	13 45 05.1706	50	13 50 05.9919
13 43 00	15.1980	13 48 00	16.0193
10	25.2253	10	26.0467
20	35.2527	20	36.0741
30	45.2801	30	46.1015
40	55.3075	40	56.1288
50	13 46 05.3348	50	13 51 06.1562
13 44 00	15.3622	13 49 00	16.1836
10	25.3896	10	26.2110
20	35.4170	20	36.2384
30	45.4444	30	46.2657
40	55.4717	40	56.2931
50	13 47 05.4991	50	13 52 06.3205

Sidereal.	Solar.	Sidereal.	Solar.
13 40 00	13 37 45.6627	13 45 00	13 42 44.8435
10	55.6354	10	54.8162
20	13 38 05.6081	20	13 43 04.7889
30	15.5808	30	14.7616
40	25.5535	40	24.7343
50	35.5262	50	34.7070
13 41 00	45.4988	13 46 00	44.6797
10	55.4715	10	54.6524
20	13 39 05.4442	20	13 44 04.6251
30	15.4169	30	14.5978
40	25.3896	40	24.5705
50	35.3623	50	34.5432
13 42 00	45.3350	13 47 00	44.5159
10	55.3077	10	54.4886
20	13 40 05.2804	20	13 45 04.4613
30	15.2531	30	14.4340
40	25.2258	40	24.4067
50	35.1985	50	34.3794
13 43 00	45.1712	13 48 00	44.3521
10	55.1439	10	54.3248
20	13 41 05.1166	20	13 46 04.2975
30	15.0893	30	14.2702
40	25.0620	40	24.2428
50	35.0347	50	34.2155
13 44 00	45.0074	13 49 00	44.1882
10	54.9801	10	54.1609
20	13 42 04.9528	20	13 47 04.1336
30	14.9255	30	14.1063
40	24.8982	40	24.0790
50	34.8708	50	34.0517

Solar.	Sidereal.	Solar.	Sidereal.
13 50 00	13 52 16.3479	13 55 00	13 57 17.1692
10	26.3753	10	27.1966
20	36.4026	20	37.2240
30	46.4300	30	47.2514
40	56.4574	40	57.2788
50	13 53 06.4848	50	13 58 07.3061
13 51 00	16.5121	13 56 00	17.3335
10	26.5395	10	27.3609
20	36.5669	20	37.3883
30	46.5943	30	47.4157
40	56.6217	40	57.4430
50	13 54 06.6490	50	13 59 07.4704
13 52 00	16.6764	13 57 00	17.4978
10	26.7038	10	27.5252
20	36.7312	20	37.5526
30	46.7586	30	47.5799
40	56.7859	40	57.6073
50	13 55 06.8133	50	14 00 07.6347
13 53 00	16.8407	13 58 00	17.6621
10	26.8681	10	27.6895
20	36.8955	20	37.7168
30	46.9228	30	47.7442
40	56.9502	40	57.7716
50	13 56 06.9776	50	14 01 07.7990
13 54 00	17.0050	13 59 00	17.8263
10	27.0324	10	27.8537
20	37.0597	20	37.8811
30	47.0871	30	47.9085
40	57.1145	40	57.9359
50	13 57 07.1419	50	14 02 07.9632

Sidereal.	Solar.	Sidereal.	Solar.
13 50 00	13 47 44.0244	13 55 00	13 52 43.2053
10	53.9971	10	53.1780
20	13 48 03.9698	20	13 53 03.1507
30	13.9425	30	13.1234
40	23.9152	40	23.0961
50	33.8879	50	33.0688
13 51 00	43.8606	13 56 00	43.0415
10	53.8333	10	53.0142
20	13 49 03.8060	20	13 54 02.9868
30	13.7787	30	12.9595
40	23.7514	40	22.9322
50	33.7241	50	32.9049
13 52 00	43.6968	13 57 00	42.8776
10	53.6695	10	52.8503
20	13 50 03.6422	20	13 55 02.8230
30	13.6148	30	12.7957
40	23.5875	40	22.7684
50	33.5602	50	32.7411
13 53 00	43.5329	13 58 00	42.7138
10	53.5056	10	52.6865
20	13 51 03.4783	20	13 56 02.6592
30	13.4510	30	12.6319
40	23.4237	40	22.6046
50	33.3964	50	32.5773
13 54 00	43.3691	13 59 00	42.5500
10	53.3418	10	52.5227
20	13 52 03.3145	20	13 57 02.4954
30	13.2872	30	12.4681
40	23.2599	40	22.4408
50	33.2326	50	32.4135

Solar.	Sidereal.	Solar.	Sidereal.
14 00 00	14 02 17.9906	14 05 00	14 07 18.8120
10	28.0180	10	28.8394
20	38.0454	20	38.8668
30	48.0728	30	48.8941
40	58.1001	40	58.9215
50	14 03 08.1275	50	14 08 08.9489
14 01 00	18.1549	14 06 00	18.9763
10	28.1823	10	29.0036
20	38.2097	20	39.0310
30	48.2370	30	49.0584
40	58.2644	40	59.0858
50	14 04 08.2918	50	14 09 09.1132
14 02 00	18.3192	14 07 00	19.1405
10	28.3465	10	29.1679
20	38.3739	20	39.1953
30	48.4013	30	49.2227
40	58.4287	40	59.2501
50	14 05 08.4561	50	14 10 09.2774
14 03 00	18.4834	14 08 00	19.3048
10	28.5108	10	29.3322
20	38.5382	20	39.3596
30	48.5656	30	49.3870
40	58.5930	40	59.4143
50	14 06 08.6203	50	14 11 09.4417
14 04 00	18.6477	14 09 00	19.4691
10	28.6751	10	29.4965
20	38.7025	20	39.5238
30	48.7299	30	49.5512
40	58.7572	40	59.5786
50	14 07 08.7846	50	14 12 09.6060

Sidereal.	Solar.	Sidereal.	Solar.
14 00 00	13 57 42.3862	14 05 00	14 02 41.5670
10	52.3588	10	51.5397
20	13 58 02.3315	20	14 03 01.5124
30	12.3042	30	11.4851
40	22.2769	40	21.4578
50	32.2496	50	31.4305
14 01 00	42.2223	14 06 00	41.4032
10	52.1950	10	51.3759
20	13 59 02.1677	20	14 04 01.3486
30	12.1404	30	11.3213
40	22.1131	40	21.2940
50	32.0858	50	31.2667
14 02 00	42.0585	14 07 00	41.2394
10	52.0312	10	51.2121
20	14 00 02.0039	20	14 05 01.1848
30	11.9766	30	11.1575
40	21.9493	40	21.1302
50	31.9220	50	31.1029
14 03 00	41.8947	14 08 00	41.0755
10	51.8674	10	51.0482
20	14 01 01.8401	20	14 06 01.0209
30	11.8128	30	10.9936
40	21.7855	40	20.9663
50	31.7582	50	30.9390
14 04 00	41.7309	14 09 00	40.9117
10	51.7035	10	50.8844
20	14 02 01.6762	20	14 07 00.8571
30	11.6489	30	10.8298
40	21.6216	40	20.8025
50	31.5943	50	30.7752

Solar.	Sidereal.	Solar.	Sidereal.
14 10 00	14 12 19.6334	14 15 00	14 17 20.4547
10	29.6607	10	30.4821
20	39.6881	20	40.5095
30	49.7155	30	50.5369
40	59.7429	40	14 18 00.5643
50	14 13 09.7703	50	10.5916
14 11 00	19.7976	14 16 00	20.6190
10	29.8250	10	30.6464
20	39.8524	20	40.6738
30	49.8798	30	50.7012
40	59.9072	40	14 19 00.7285
50	14 14 09.9345	50	10.7559
14 12 00	19.9619	14 17 00	20.7833
10	29.9893	10	30.8107
20	40.0167	20	40.8380
30	50.0441	30	50.8654
40	14 15 00.0714	40	14 20 00.8928
50	10.0988	50	10.9202
14 13 00	20.1262	14 18 00	20.9476
10	30.1536	10	30.9749
20	40.1809	20	41.0023
30	50.2083	30	51.0297
40	14 16 00.2357	40	14 21 01.0571
50	10.2631	50	11.0845
14 14 00	20.2905	14 19 00	21.1118
10	30.3178	10	31.1392
20	40.3452	20	41.1666
30	50.3726	30	51.1940
40	14 17 00.4000	40	14 22 01.2214
50	10.4274	50	11.2487



Sidereal.	Solar.	Sidereal.	Solar.
14 10 00	14 07 40.7479	14 15 00	14 12 39.9288
10	50.7206	10	49.9015
20	14 08 00.6933	20	59.8742
30	10.6660	30	14 13 09.8469
40	20.6387	40	19.8195
50	30.6114	50	29.7922
14 11 00	40.5841	14 16 00	39.7649
10	50.5568	10	49.7376
20	14 09 00.5295	20	59.7103
30	10.5022	30	14 14 09.6830
40	20.4749	40	19.6557
50	30.4475	50	29.6284
14 12 00	40.4202	14 17 00	39.6011
10	50.3929	10	49.5738
20	14 10 00.3656	20	59.5465
30	10.3383	30	14 15 09.5192
40	20.3110	40	19.4919
50	30.2837	50	29.4646
14 13 00	40.2564	14 18 00	39.4373
10	50.2291	10	49.4100
20	14 11 00.2018	20	59.3827
30	10.1745	30	14 16 09.3554
40	20.1472	40	19.3281
50	30.1199	50	29.3008
14 14 00	40.0926	14 19 00	39.2735
10	50.0653	10	49.2462
20	14 12 00.0380	20	59.2189
30	10.0107	30	14 17 09.1915
40	19.9834	40	19.1642
50	29.9561	50	29.1369

Solar.	Sidereal.	Solar.	Sidereal.
14 20 00	14 22 21.2761	14 25 00	14 27 22.0975
10	31.3035	10	32.1249
20	41.3309	20	42.1522
30	51.3582	30	52.1796
40	14 23 01.3856	40	14 28 02.2070
50	11.4130	50	12.2344
14 21 00	21.4404	14 26 00	22.2618
10	31.4678	10	32.2891
20	41.4951	20	42.3165
30	51.5225	30	52.3439
40	14 24 01.5499	40	14 29 02.3713
50	11.5773	50	12.3987
14 22 00	21.6047	14 27 00	22.4260
10	31.6320	10	32.4534
20	41.6594	20	42.4808
30	51.6868	30	52.5082
40	14 25 01.7142	40	14 30 02.5355
50	11.7416	50	12.5629
14 23 00	21.7689	14 28 00	22.5903
10	31.7963	10	32.6177
20	41.8237	20	42.6451
30	51.8511	30	52.6724
40	14 26 01.8785	40	14 31 02.6998
50	11.9058	50	12.7272
14 24 00	21.9332	14 29 00	22.7546
10	31.9606	10	32.7820
20	41.9880	20	42.8093
30	52.0153	30	52.8367
40	14 27 02.0427	40	14 32 02.8641
50	12.0701	50	12.8915

Sidereal.	Solar.	Sidereal.	Solar.
14 20 00	14 17 39.1096	14 25 00	14 22 38.2905
10	49.0823	10	48.2632
20	59.0550	20	58.2359
30	14 18 09.0277	30	14 23 08.2086
40	19.0004	40	18.1813
50	28.9731	50	28.1540
14 21 00	38.9458	14 26 00	38.1267
10	48.9185	10	48.0994
20	58.8912	20	58.0721
30	14 19 08.8639	30	14 24 08.0448
40	18.8366	40	18.0175
50	28.8093	50	27.9902
14 22 00	38.7820	14 27 00	37.9629
10	48.7547	10	47.9355
20	58.7274	20	57.9082
30	14 20 08.7001	30	14 25 07.8809
40	18.6728	40	17.8536
50	28.6455	50	27.8263
14 23 00	38.6182	14 28 00	37.7990
10	48.5909	10	47.7717
20	58.5635	20	57.7444
30	14 21 08.5362	30	14 26 07.7171
40	18.5089	40	17.6898
50	28.4816	50	27.6625
14 24 00	38.4543	14 29 00	37.6352
10	48.4270	10	47.6079
20	58.3997	20	57.5806
30	14 22 08.3724	30	14 27 07.5533
40	18.3451	40	17.5260
50	28.3178	50	27.4987

Solar.	Sidereal.	Solar.	Sidereal.
14 30 00	14 32 22.9189	14 35 00	14 37 23.7402
10	32.9462	10	33.7676
20	42.9736	20	43.7950
30	53.0010	30	53.8224
40	14 33 03.0284	40	14 38 03.8497
50	13.0558	50	13.8771
14 31 00	23.0831	14 36 00	23.9045
10	33.1105	10	33.9319
20	43.1379	20	43.9593
30	53.1653	30	53.9866
40	14 34 03.1926	40	14 39 04.0140
50	13.2200	50	14.0414
14 32 00	23.2474	14 37 00	24.0688
10	33.2748	10	34.0962
20	43.3022	20	44.1235
30	53.3295	30	54.1509
40	14 35 03.3569	40	14 40 04.1783
50	13.3843	50	14.2057
14 33 00	23.4117	14 38 00	24.2331
10	33.4391	10	34.2604
20	43.4664	20	44.2878
30	53.4938	30	54.3152
40	14 36 03.5212	40	14 41 04.3426
50	13.5486	50	14.3699
14 34 00	23.5760	14 39 00	24.3973
10	33.6033	10	34.4247
20	43.6307	20	44.4521
30	53.6581	30	54.4795
40	14 37 03.6855	40	14 42 04.5068
50	13.7129	50	14.5342

Sidereal.	Solar.	Sidereal.	Solar.
14 30 00	14 27 37.4714	14 35 00	14 32 36.6522
10	47.4441	10	46.6249
20	57.4168	20	56.5976
30	14 28 07.3895	30	14 33 06.5703
40	17.3622	40	16.5430
50	27.3349	50	26.5157
14 31 00	37.3075	14 36 00	36.4884
10	47.2802	10	46.4611
20	57.2529	20	56.4338
30	14 29 07.2256	30	14 34 06.4065
40	17.1983	40	16.3792
50	27.1710	50	26.3519
14 32 00	37.1437	14 37 00	36.3246
10	47.1164	10	46.2973
20	57.0891	20	56.2700
30	14 30 07.0618	30	14 35 06.2427
40	17.0345	40	16.2154
50	27.0072	50	26.1881
14 33 00	36.9799	14 38 00	36.1608
10	46.9526	10	46.1335
20	56.9253	20	56.1062
30	14 31 06.8980	30	14 36 06.0789
40	16.8707	40	16.0515
50	26.8434	50	26.0242
14 34 00	36.8161	14 39 00	35.9969
10	46.7888	10	45.9696
20	56.7615	20	55.9423
30	14 32 06.7342	30	14 37 05.9150
40	16.7069	40	15.8877
50	26.6795	50	25.8604

Solar.	Sidereal.	Solar.	Sidereal.
14 40 00	14 42 24.5616	14 45 00	14 47 25.3830
10	34.5890	10	35.4104
20	44.6164	20	45.4377
30	54.6437	30	55.4651
40	14 43 04.6711	40	14 48 05.4925
50	14.6985	50	15.5199
14 41 00	24.7259	14 46 00	25.5472
10	34.7533	10	35.5746
20	44.7806	20	45.6020
30	54.8080	30	55.6294
40	14 44 04.8354	40	14 49 05.6568
50	14.8628	50	15.6841
14 42 00	24.8902	14 47 00	25.7115
10	34.9175	10	35.7389
20	44.9449	20	45.7663
30	54.9723	30	55.7937
40	14 45 04.9997	40	14 50 05.8210
50	15.0270	50	15.8484
14 43 00	25.0544	14 48 00	25.8758
10	35.0818	10	35.9032
20	45.1092	20	45.9306
30	55.1366	30	55.9579
40	14 46 05.1639	40	14 51 05.9853
50	15.1913	50	16.0127
14 44 00	25.2187	14 49 00	26.0401
10	35.2461	10	36.0675
20	45.2735	20	46.0948
30	55.3008	30	56.1222
40	14 47 05.3282	40	14 52 06.1496
50	15.3556	50	16.1770

Sidereal.	Solar.	Sidereal.	Solar.
14 40 00	14 37 35.8331	14 45 00	14 42 35.0140
10	45.8058	10	44.9867
20	55.7785	20	54.9594
30	14 38 05.7512	30	14 43 04.9321
40	15.7239	40	14.9048
50	25.6966	50	24.8775
14 41 00	35.6693	14 46 00	34.8502
10	45.6420	10	44.8229
20	55.6147	20	54.7955
30	14 39 05.5874	30	14 44 04.7682
40	15.5601	40	14.7409
50	25.5328	50	24.7136
14 42 00	35.5055	14 47 00	34.6863
10	45.4782	10	44.6590
20	55.4509	20	54.6317
30	14 40 05.4235	30	14 45 04.6044
40	15.3962	40	14.5771
50	25.3689	50	24.5498
14 43 00	35.3416	14 48 00	34.5225
10	45.3143	10	44.4952
20	55.2870	20	54.4679
30	14 41 05.2597	30	14 46 04.4406
40	15.2324	40	14.4133
50	25.2051	50	24.3860
14 44 00	35.1778	14 49 00	34.3587
10	45.1505	10	44.3314
20	55.1232	20	54.3041
30	14 42 05.0959	30	14 47 04.2768
40	15.0686	40	14.2495
50	25.0413	50	24.2222

Solar.	Sidereal.	Solar.	Sidereal.
14 50 00	14 52 26.2043	14 55 00	14 57 27.0257
10	36.2317	10	37.0531
20	46.2591	20	47.0805
30	56.2865	30	57.1079
40	14 53 06.3139	40	14 58 07.1352
50	16.3412	50	17.1626
14 51 00	26.3686	14 56 00	27.1900
10	36.3960	10	37.2174
20	46.4234	20	47.2448
30	56.4508	30	57.2721
40	14 54 06.4781	40	14 59 07.2995
50	16.5055	50	17.3269
14 52 00	26.5329	14 57 00	27.3543
10	36.5603	10	37.3816
20	46.5877	20	47.4090
30	56.6150	30	57.4364
40	14 55 06.6424	40	15 00 07.4638
50	16.6698	50	17.4912
14 53 00	26.6972	14 58 00	27.5185
10	36.7246	10	37.5459
20	46.7519	20	47.5733
30	56.7793	30	57.6007
40	14 56 06.8067	40	15 01 07.6281
50	16.8341	50	17.6554
14 54 00	26.8614	14 59 00	27.6828
10	36.8888	10	37.7102
20	46.9162	20	47.7376
30	56.9436	30	57.7650
40	14 57 06.9710	40	15 02 07.7923
50	16.9983	50	17.8197



Sidereal.	Solar.	Sidereal.	Solar.
14 50 00	14 47 34.1949	14 55 00	14 52 33.3757
10	44.1675	10	43.3484
20	54.1402	20	53.3211
30	14 48 04.1129	30	14 53 03.2938
40	14.0856	40	13.2665
50	24.0583	50	23.2392
14 51 00	34.0310	14 56 00	33.2119
10	44.0037	10	43.1846
20	53.9764	20	53.1573
30	14 49 03.9491	30	14 54 03.1300
40	13.9218	40	13.1027
50	23.8945	50	23.0754
14 52 00	33.8672	14 57 00	33.0481
10	43.8399	10	43.0208
20	53.8126	20	52.9935
30	14 50 03.7853	30	14 55 02.9662
40	13.7580	40	12.9389
50	23.7307	50	22.9116
14 53 00	33.7034	14 58 00	32.8842
10	43.6761	10	42.8569
20	53.6488	20	52.8296
30	14 51 03.6215	30	14 56 02.8023
40	13.5942	40	12.7750
50	23.5669	50	22.7477
14 54 00	33.5395	14 59 00	32.7204
10	43.5122	10	42.6931
20	53.4849	20	52.6658
30	14 52 03.4576	30	14 57 02.6385
40	13.4303	40	12.6112
50	23.4030	50	22.5839

Solar.	Sidereal.	Solar.	Sidereal.
15 00 00	15 02 27.8471	15 05 00	15 07 28.6685
10	37.8745	10	38.6958
20	47.9019	20	48.7232
30	57.9292	30	58.7506
40	15 03 07.9566	40	15 08 08.7780
50	17.9840	50	18.8054
15 01 00	28.0114	15 06 00	28.8327
10	38.0387	10	38.8601
20	48.0661	20	48.8875
30	58.0935	30	58.9149
40	15 04 08.1209	40	15 09 08.9423
50	18.1483	50	18.9696
15 02 00	28.1756	15 07 00	28.9970
10	38.2030	10	39.0244
20	48.2304	20	49.0518
30	58.2578	30	59.0792
40	15 05 08.2852	40	15 10 09.1065
50	18.3125	50	19.1339
15 03 00	28.3399	15 08 00	29.1613
10	38.3673	10	39.1887
20	48.3947	20	49.2160
30	58.4221	30	59.2434
40	15 06 08.4494	40	15 11 09.2708
50	18.4768	50	19.2982
15 04 00	28.5042	15 09 00	29.3256
10	38.5316	10	39.3529
20	48.5589	20	49.3803
30	58.5863	30	59.4077
40	15 07 08.6137	40	15 12 09.4351
50	18.6411	50	19.4625

Sidereal.	Solar.	Sidereal.	Solar.
15 00 00	14 57 32.5566	15 05 00	15 02 31.7375
10	42.5293	10	41.7102
20	52.5020	20	51.6829
30	14 58 02.4747	30	15 03 01.6556
40	12.4474	40	11.6282
50	22.4201	50	21.6009
15 01 00	32.3928	15 06 00	31.5736
10	42.3655	10	41.5463
20	52.3382	20	51.5190
30	14 59 02.3109	30	15 04 01.4917
40	12.2836	40	11.4644
50	22.2562	50	21.4371
15 02 00	32.2289	15 07 00	31.4098
10	42.2016	10	41.3825
20	52.1743	20	51.3552
30	15 00 02.1470	30	15 05 01.3279
40	12.1197	40	11.3006
50	22.0924	50	21.2733
15 03 00	32.0651	15 08 00	31.2460
10	42.0378	10	41.2187
20	52.0105	20	51.1914
30	15 01 01.9832	30	15 06 01.1641
40	11.9559	40	11.1368
50	21.9286	50	21.1095
15 04 00	31.9013	15 09 00	31.0822
10	41.8740	10	41.0549
20	51.8467	20	51.0276
30	15 02 01.8194	30	15 07 01.0002
40	11.7921	40	10.9729
50	21.7648	50	20.9456

Solar.	Sidereal.	Solar.	Sidereal.
15 10 00	15 12 29.4898	15 15 00	15 17 30.3112
10	39.5172	10	40.3386
20	49.5446	20	50.3660
30	59.5720	30	15 18 00.3933
40	15 13 09.5994	40	10.4207
50	19.6267	50	20.4481
15 11 00	29.6541	15 16 00	30.4755
10	39.6815	10	40.5029
20	49.7089	20	50.5302
30	59.7363	30	15 19 00.5576
40	15 14 09.7636	40	10.5850
50	19.7910	50	20.6124
15 12 00	29.8184	15 17 00	30.6398
10	39.8458	10	40.6671
20	49.8731	20	50.6945
30	59.9005	30	15 20 00.7219
40	15 15 09.9279	40	10.7493
50	19.9553	50	20.7767
15 13 00	29.9827	15 18 00	30.8040
10	40.0100	10	40.8314
20	50.0374	20	50.8588
30	15 16 00.0648	30	15 21 00.8862
40	10.0922	40	10.9136
50	20.1196	50	20.9409
15 14 00	30.1469	15 19 00	30.9683
10	40.1743	10	40.9957
20	50.2017	20	51.0231
30	15 17 00.2291	30	15 22 01.0504
40	10.2565	40	11.0778
50	20.2838	50	21.1052

Sidereal.	Solar.	Sidereal.	Solar.
15 10 00	15 07 30.9183	15 15 00	15 12 30.0992
10	40.8910	10	40.0719
20	50.8637	20	50.0446
30	15 08 00.8364	30	15 13 00.0173
40	10.8091	40	09.9900
50	20.7818	50	19.9627
15 11 00	30.7545	15 16 00	29.9354
10	40.7272	10	39.9081
20	50.6999	20	49.8808
30	15 09 00.6726	30	59.8535
40	10.6453	40	15 14 09.8262
50	20.6180	50	19.7989
15 12 00	30.5907	15 17 00	29.7716
10	40.5634	10	39.7442
20	50.5361	20	49.7169
30	15 10 00.5088	30	59.6896
40	10.4815	40	15 15 09.6623
50	20.4542	50	19.6350
15 13 00	30.4269	15 18 00	29.6077
10	40.3996	10	39.5804
20	50.3722	20	49.5531
30	15 11 00.3449	30	59.5258
40	10.3176	40	15 16 09.4985
50	20.2903	50	19.4712
15 14 00	30.2630	15 19 00	29.4439
10	40.2357	10	39.4166
20	50.2084	20	49.3893
30	15 12 00.1811	30	59.3620
40	10.1538	40	15 17 09.3347
50	20.1265	50	19.3074

Solar.	Sidereal.	Solar.	Sidereal.
15 20 00	15 22 31.1326	15 25 00	15 27 31.9540
10	41.1600	10	41.9813
20	51.1873	20	52.0087
30	15 23 01.2147	30	15 28 02.0361
40	11.2421	40	12.0635
50	21.2695	50	22.0909
15 21 00	31.2969	15 26 00	32.1182
10	41.3242	10	42.1456
20	51.3516	20	52.1730
30	15 24 01.3790	30	15 29 02.2004
40	11.4064	40	12.2277
50	21.4338	50	22.2551
15 22 00	31.4611	15 27 00	32.2825
10	41.4885	10	42.3099
20	51.5159	20	52.3373
30	15 25 01.5433	30	15 30 02.3646
40	11.5706	40	12.3920
50	21.5980	50	22.4194
15 23 00	31.6254	15 28 00	32.4468
10	41.6528	10	42.4742
20	51.6802	20	52.5015
30	15 26 01.7075	30	15 31 02.5289
40	11.7349	40	12.5563
50	21.7623	50	22.5837
15 24 00	31.7897	15 29 00	32.6111
10	41.8171	10	42.6384
20	51.8444	20	52.6658
30	15 27 01.8718	30	15 32 02.6932
40	11.8992	40	12.7206
50	21.9266	50	22.7480

Sidereal.	Solar.	Sidereal.	Solar.
15 20 00	15 17 29.2801	15 25 00	15 22 28.4609
10	39.2528	10	38.4336
20	49.2255	20	48.4063
30	59.1982	30	58.3790
40	15 18 09.1709	40	15 23 08.3517
50	19.1436	50	18.3244
15 21 00	29.1162	15 26 00	28.2971
10	39.0889	10	38.2698
20	49.0616	20	48.2425
30	59.0343	30	58.2152
40	15 19 09.0070	40	15 24 08.1879
50	18.9797	50	18.1606
15 22 00	28.9524	15 27 00	28.1333
10	38.9251	10	38.1060
20	48.8978	20	48.0787
30	58.8705	30	58.0514
40	15 20 08.8432	40	15 25 08.0241
50	18.8159	50	17.9968
15 23 00	28.7886	15 28 00	27.9695
10	38.7613	10	37.9422
20	48.7340	20	47.9149
30	58.7067	30	57.8876
40	15 21 08.6794	40	15 26 07.8602
50	18.6521	50	17.8329
15 24 00	28.6248	15 29 00	27.8056
10	38.5975	10	37.7783
20	48.5702	20	47.7510
30	58.5429	30	57.7237
40	15 22 08.5156	40	15 27 07.6964
50	18.4882	50	17.6691

Solar.	Sidereal.	Solar.	Sidereal.
15 30 00	15 32 32.7753	15 35 00	15 37 33.5967
10	42.8027	10	43.6241
20	52.8301	20	53.6515
30	15 33 02.8575	30	15 38 03.6788
40	12.8848	40	13.7062
50	22.9122	50	23.7336
15 31 00	32.9396	15 36 00	33.7610
10	42.9670	10	43.7884
20	52.9944	20	53.8157
30	15 34 03.0217	30	15 39 03.8431
40	13.0491	40	13.8705
50	23.0765	50	23.8979
15 32 00	33.1039	15 37 00	33.9253
10	43.1313	10	43.9526
20	53.1586	20	53.9800
30	15 35 03.1860	30	15 40 04.0074
40	13.2134	40	14.0348
50	23.2408	50	24.0621
15 33 00	33.2682	15 38 00	34.0895
10	43.2955	10	44.1169
20	53.3229	20	54.1443
30	15 36 03.3503	30	15 41 04.1717
40	13.3777	40	14.1990
50	23.4050	50	24.2264
15 34 00	33.4324	15 39 00	34.2538
10	43.4598	10	44.2812
20	53.4872	20	54.3086
30	15 37 03.5146	30	15 42 04.3359
40	13.5419	40	14.3633
50	23.5693	50	24.3907



Sidereal.	Solar.	Sidereal.	Solar.
15 30 00	15 27 27.6418	15 35 00	15 32 26.8227
10	37.6145	10	36.7954
20	47.5872	20	46.7681
30	57.5599	30	56.7408
40	15 28 07.5326	40	15 33 06.7135
50	17.5053	50	16.6862
15 31 00	27.4780	15 36 00	26.6589
10	37.4507	10	36.6316
20	47.4234	20	46.6042
30	57.3961	30	56.5769
40	15 29 07.3688	40	15 34 06.5496
50	17.3415	50	16.5223
15 32 00	27.3142	15 37 00	26.4950
10	37.2869	10	36.4677
20	47.2596	20	46.4404
30	57.2322	30	56.4131
40	15 30 07.2049	40	15 35 06.3858
50	17.1776	50	16.3585
15 33 00	27.1503	15 38 00	26.3312
10	37.1230	10	36.3039
20	47.0957	20	46.2766
30	57.0684	30	56.2493
40	15 31 07.0411	40	15 36 06.2220
50	17.0138	50	16.1947
15 34 00	26.9865	15 39 00	26.1674
10	36.9592	10	36.1401
20	46.9319	20	46.1128
30	56.9046	30	56.0855
40	15 32 06.8773	40	15 37 06.0582
50	16.8500	50	16.0309

Solar.	Sidereal.	Solar.	Sidereal.
15 40 00	15 42 34.4181	15 45 00	15 47 35.2394
10	44.4455	10	45.2668
20	54.4728	20	55.2942
30	15 43 04.5002	30	15 48 05.3216
40	14.5276	40	15.3490
50	24.5550	50	25.3763
15 41 00	34.5823	15 46 00	35.4037
10	44.6097	10	45.4311
20	54.6371	20	55.4585
30	15 44 04.6645	30	15 49 05.4859
40	14.6919	40	15.5132
50	24.7192	50	25.5406
15 42 00	34.7466	15 47 00	35.5680
10	44.7740	10	45.5954
20	54.8014	20	55.6228
30	15 45 04.8288	30	15 50 05.6501
40	14.8561	40	15.6775
50	24.8835	50	25.7049
15 43 00	34.9109	15 48 00	35.7323
10	44.9383	10	45.7597
20	54.9657	20	55.7870
30	15 46 04.9930	30	15 51 05.8144
40	15.0204	40	15.8418
50	25.0478	50	25.8692
15 44 00	35.0752	15 49 00	35.8965
10	45.1026	10	45.9239
20	55.1299	20	55.9513
30	15 47 05.1573	30	15 52 05.9787
40	15.1847	40	16.0061
50	25.2121	50	26.0334

Sidereal.	Solar.	Sidereal.	Solar.
15 40 00	15 37 26.0036	15 45 00	15 42 25.1844
10	35.9762	10	35.1571
20	45.9489	20	45.1298
30	55.9216	30	55.1025
40	15 38 05.8943	40	15 43 05.0752
50	15.8670	50	15.0479
15 41 00	25.8397	15 46 00	25.0206
10	35.8124	10	34.9933
20	45.7851	20	44.9660
30	55.7578	30	54.9387
40	15 39 05.7305	40	15 44 04.9114
50	15.7032	50	14.8841
15 42 00	25.6759	15 47 00	24.8568
10	35.6486	10	34.8295
20	45.6213	20	44.8022
30	55.5940	30	54.7749
40	15 40 05.5667	40	15 45 04.7476
50	15.5394	50	14.7202
15 43 00	25.5121	15 48 00	24.6929
10	35.4848	10	34.6656
20	45.4575	20	44.6383
30	55.4302	30	54.6110
40	15 41 05.4029	40	15 46 04.5837
50	15.3756	50	14.5564
15 44 00	25.3482	15 49 00	24.5291
10	35.3209	10	34.5018
20	45.2936	20	44.4745
30	55.2663	30	54.4472
40	15 42 05.2390	40	15 47 04.4199
50	15.2117	50	14.3926

Solar.	Sidereal.	Solar.	Sidereal.
15 50 00	15 52 36.0608	15 55 00	15 57 36.8822
10	46.0882	10	46.9096
20	56.1156	20	56.9370
30	15 53 06.1430	30	15 58 06.9643
40	16.1703	40	16.9917
50	26.1977	50	27.0191
15 51 00	36.2251	15 56 00	37.0465
10	46.2525	10	47.0738
20	56.2799	20	57.1012
30	15 54 06.3072	30	15 59 07.1286
40	16.3346	40	17.1560
50	26.3620	50	27.1834
15 52 00	36.3894	15 57 00	37.2107
10	46.4167	10	47.2381
20	56.4441	20	57.2655
30	15 55 06.4715	30	16 00 07.2929
40	16.4989	40	17.3203
50	26.5263	50	27.3476
15 53 00	36.5536	15 58 00	37.3750
10	46.5810	10	47.4024
20	56.6084	20	57.4298
30	15 56 06.6358	30	16 01 07.4572
40	16.6632	40	17.4845
50	26.6905	50	27.5119
15 54 00	36.7179	15 59 00	37.5393
10	46.7453	10	47.5667
20	56.7727	20	57.5940
30	15 57 06.8001	30	16 02 07.6214
40	16.8274	40	17.6488
50	26.8548	50	27.6762

Sidereal.	Solar.	Sidereal.	Solar.
15 50 00	15 47 24.3653	15 55 00	15 52 23.5462
10	34.3380	10	33.5189
20	44.3107	20	43.4916
30	54.2834	30	53.4643
40	15 48 04.2561	40	15 53 03.4369
50	14.2288	50	13.4096
15 51 00	24.2015	15 56 00	23.3823
10	34.1742	10	33.3550
20	44.1469	20	43.3277
30	54.1196	30	53.3004
40	15 49 04.0923	40	15 54 03.2731
50	14.0649	50	13.2458
15 52 00	24.0376	15 57 00	23.2185
10	34.0103	10	33.1912
20	43.9830	20	43.1639
30	53.9557	30	53.1366
40	15 50 03.9284	40	15 55 03.1093
50	13.9011	50	13.0820
15 53 00	23.8738	15 58 00	23.0547
10	33.8465	10	33.0274
20	43.8192	20	43.0001
30	53.7919	30	52.9728
40	15 51 03.7646	40	15 56 02.9455
50	13.7373	50	12.9182
15 54 00	23.7100	15 59 00	22.8909
10	33.6827	10	32.8636
20	43.6554	20	42.8363
30	53.6281	30	52.8089
40	15 52 03.6008	40	15 57 02.7816
50	13.5735	50	12.7543

Solar.	Sidereal.	Solar.	Sidereal.
16 00 00	16 02 37.7036	16 05 00	16 07 38.5249
10	47.7309	10	48.5523
20	57.7583	20	58.5797
30	16 03 07.7857	30	16 08 08.6071
40	17.8131	40	18.6345
50	27.8405	50	28.6618
16 01 00	37.8678	16 06 00	38.6892
10	47.8952	10	48.7166
20	57.9226	20	58.7440
30	16 04 07.9500	30	16 09 08.7714
40	17.9774	40	18.7987
50	28.0047	50	28.8261
16 02 00	38.0321	16 07 00	38.8535
10	48.0595	10	48.8809
20	58.0869	20	58.9082
30	16 05 08.1143	30	16 10 08.9356
40	18.1416	40	18.9630
50	28.1690	50	28.9904
16 03 00	38.1964	16 08 00	39.0178
10	48.2238	10	49.0451
20	58.2511	20	59.0725
30	16 06 08.2785	30	16 11 09.0999
40	18.3059	40	19.1273
50	28.3333	50	29.1547
16 04 00	38.3607	16 09 00	39.1820
10	48.3880	10	49.2094
20	58.4154	20	59.2368
30	16 07 08.4428	30	16 12 09.2642
40	18.4702	40	19.2916
50	28.4976	50	29.3189

Sidereal.	Solar.	Sidereal.	Solar.
16 00 00	15 57 22.7270	16 05 00	16 02 21.9079
10	32.6997	10	31.8806
20	42.6724	20	41.8533
30	52.6451	30	51.8260
40	15 58 02.6178	40	16 03 01.7987
50	12.5905	50	11.7714
16 01 00	22.5632	16 06 00	21.7441
10	32.5359	10	31.7168
20	42.5086	20	41.6895
30	52.4813	30	51.6622
40	15 59 02.4540	40	16 04 01.6349
50	12.4267	50	11.6076
16 02 00	22.3994	16 07 00	21.5803
10	32.3721	10	31.5529
20	42.3448	20	41.5256
30	52.3175	30	51.4983
40	16 00 02.2902	40	16 05 01.4710
50	12.2629	50	11.4437
16 03 00	22.2356	16 08 00	21.4164
10	32.2083	10	31.3891
20	42.1809	20	41.3618
30	52.1536	30	51.3345
40	16 01 02.1263	40	16 06 01.3072
50	12.0990	50	11.2799
16 04 00	22.0717	16 09 00	21.2526
10	32.0444	10	31.2253
20	42.0171	20	41.1980
30	51.9898	30	51.1707
40	16 02 01.9625	40	16 07 01.1434
50	11.9352	50	11.1161

Solar.	Sidereal.	Solar.	Sidereal.
16 10 00	16 12 39.3463	16 15 00	16 17 40.1677
10	49.3737	10	50.1951
20	59.4011	20	16 18 00.2224
30	16 13 09.4284	30	10.2498
40	19.4558	40	20.2772
50	29.4832	50	30.3046
16 11 00	39.5106	16 16 00	40.3320
10	49.5380	10	50.3593
20	59.5653	20	16 19 00.3867
30	16 14 09.5927	30	10.4141
40	19.6201	40	20.4415
50	29.6475	50	30.4689
16 12 00	39.6749	16 17 00	40.4962
10	49.7022	10	50.5236
20	59.7296	20	16 20 00.5510
30	16 15 09.7570	30	10.5784
40	19.7844	40	20.6057
50	29.8118	50	30.6331
16 13 00	39.8391	16 18 00	40.6605
10	49.8665	10	50.6879
20	59.8939	20	16 21 00.7153
30	16 16 09.9213	30	10.7426
40	19.9487	40	20.7700
50	29.9760	50	30.7974
16 14 00	40.0034	16 19 00	40.8248
10	50.0308	10	50.8522
20	16 17 00.0582	20	16 22 00.8795
30	10.0855	30	10.9069
40	20.1129	40	20.9343
50	30.1403	50	30.9617



Sidereal.	Solar.	Sidereal.	Solar.
16 10 00	16 07 21.0888	16 15 00	16 12 20.2696
10	31.0615	10	30.2423
20	41.0342	20	40.2150
30	51.0069	30	50.1877
40	16 08 00.9796	40	16 13 00.1604
50	10.9523	50	10.1331
16 11 00	20.9249	16 16 00	20.1058
10	30.8976	10	30.0785
20	40.8703	20	40.0512
30	50.8430	30	50.0239
40	16 09 00.8157	40	59.9966
50	10.7884	50	16 14 09.9693
16 12 00	20.7611	16 17 00	19.9420
10	30.7338	10	29.9147
20	40.7065	20	39.8874
30	50.6792	30	49.8601
40	16 10 00.6519	40	59.8328
50	10.6246	50	16 15 09.8055
16 13 00	20.5973	16 18 00	19.7782
10	30.5700	10	29.7509
20	40.5427	20	39.7236
30	50.5154	30	49.6963
40	16 11 00.4881	40	59.6689
50	10.4608	50	16 16 09.6416
16 14 00	20.4335	16 19 00	19.6143
10	30.4062	10	29.5870
20	40.3789	20	39.5597
30	50.3516	30	49.5324
40	16 12 00.3243	40	59.5051
50	10.2969	50	16 17 09.4778

Solar.	Sidereal.	Solar.	Sidereal.
16 20 00	16 22 40.9891	16 25 00	16 27 41.8104
10	51.0164	10	51.8378
20	16 23 01.0438	20	16 28 01.8652
30	11.0712	30	11.8926
40	21.0986	40	21.9199
50	31.1260	50	31.9473
16 21 00	41.1533	16 26 00	41.9747
10	51.1807	10	52.0021
20	16 24 01.2081	20	16 29 02.0295
30	11.2355	30	12.0568
40	21.2628	40	22.0842
50	31.2902	50	32.1116
16 22 00	41.3176	16 27 00	42.1390
10	51.3450	10	52.1664
20	16 25 01.3724	20	16 30 02.1937
30	11.3997	30	12.2211
40	21.4271	40	22.2485
50	31.4545	50	32.2759
16 23 00	41.4819	16 28 00	42.3033
10	51.5093	10	52.3306
20	16 26 01.5366	20	16 31 02.3580
30	11.5640	30	12.3854
40	21.5914	40	22.4128
50	31.6188	50	32.4401
16 24 00	41.6462	16 29 00	42.4675
10	51.6735	10	52.4949
20	16 27 01.7009	20	16 32 02.5223
30	11.7283	30	12.5497
40	21.7557	40	22.5770
50	31.7831	50	32.6044

Sidereal.	Solar.	Sidereal.	Solar.
16 20 00	16 17 19.4505	16 25 00	16 22 18.6314
10	29.4232	10	28.6041
20	39.3959	20	38.5768
30	49.3686	30	48.5495
40	59.3413	40	58.5222
50	16 18 09.3140	50	16 23 08.4949
16 21 00	19.2867	16 26 00	18.4676
10	29.2594	10	28.4403
20	39.2321	20	38.4129
30	49.2048	30	48.3856
40	59.1775	40	58.3583
50	16 19 09.1502	50	16 24 08.3310
16 22 00	19.1229	16 27 00	18.3037
10	29.0956	10	28.2764
20	39.0683	20	38.2491
30	49.0409	30	48.2218
40	59.0136	40	58.1945
50	16 20 08.9863	50	16 25 08.1672
16 23 00	18.9590	16 28 00	18.1399
10	28.9317	10	28.1126
20	38.9044	20	38.0853
30	48.8771	30	48.0580
40	58.8498	40	58.0307
50	16 21 08.8225	50	16 26 08.0034
16 24 00	18.7952	16 29 00	17.9761
10	28.7679	10	27.9488
20	38.7406	20	37.9215
30	48.7133	30	47.8942
40	58.6860	40	57.8669
50	16 22 08.6587	50	16 27 07.8396

Solar.	Sidereal.	Solar.	Sidereal.
16 30 00	16 32 42.6318	16 35 00	16 37 43.4532
10	52.6592	10	53.4806
20	16 33 02.6866	20	16 38 03.5079
30	12.7139	30	13.5353
40	22.7413	40	23.5627
50	32.7687	50	33.5901
16 31 00	42.7961	16 36 00	43.6174
10	52.8235	10	53.6448
20	16 34 02.8508	20	16 39 03.6722
30	12.8782	30	13.6996
40	22.9056	40	23.7270
50	32.9330	50	33.7543
16 32 00	42.9604	16 37 00	43.7817
10	52.9877	10	53.8091
20	16 35 03.0151	20	16 40 03.8365
30	13.0425	30	13.8639
40	23.0699	40	23.8912
50	33.0972	50	33.9186
16 33 00	43.1246	16 38 00	43.9460
10	53.1520	10	53.9734
20	16 36 03.1794	20	16 41 04.0008
30	13.2068	30	14.0281
40	23.2341	40	24.0555
50	33.2615	50	34.0829
16 34 00	43.2889	16 39 00	44.1103
10	53.3163	10	54.1377
20	16 37 03.3437	20	16 42 04.1650
30	13.3710	30	14.1924
40	23.3984	40	24.2198
50	33.4258	50	34.2472

Sidereal.	Solar.	Sidereal.	Solar.
16 30 00	16 27 17.8123	16 35 00	16 32 16.9931
10	27.7849	10	26.9658
20	37.7576	20	36.9385
30	47.7303	30	46.9112
40	57.7030	40	56.8839
50	16 28 07.6757	50	16 33 06.8566
16 31 00	17.6484	16 36 00	16.8293
10	27.6211	10	26.8020
20	37.5938	20	36.7747
30	47.5665	30	46.7474
40	57.5392	40	56.7201
50	16 29 07.5119	50	16 34 06.6928
16 32 00	17.4846	16 37 00	16.6655
10	27.4573	10	26.6382
20	37.4300	20	36.6109
30	47.4027	30	46.5836
40	57.3754	40	56.5563
50	16 30 07.3481	50	16 35 06.5289
16 33 00	17.3208	16 38 00	16.5016
10	27.2935	10	26.4743
20	37.2662	20	36.4470
30	47.2389	30	46.4197
40	57.2116	40	56.3924
50	16 31 07.1843	50	16 36 06.3651
16 34 00	17.1569	16 39 00	16.3378
10	27.1296	10	26.3105
20	37.1023	20	36.2832
30	47.0750	30	46.2559
40	57.0477	40	56.2286
50	16 32 07.0204	50	16 37 06.2013

Solar.	Sidereal.	Solar.	Sidereal.
16 40 00	16 42 44.2745	16 45 00	16 47 45.0959
10	54.3019	10	55.1233
20	16 43 04.3293	20	16 48 05.1507
30	14.3567	30	15.1781
40	24.3841	40	25.2054
50	34.4114	50	35.2328
16 41 00	44.4388	16 46 00	45.2602
10	54.4662	10	55.2876
20	16 44 04.4936	20	16 49 05.3150
30	14.5210	30	15.3423
40	24.5483	40	25.3697
50	34.5757	50	35.3971
16 42 00	44.6031	16 47 00	45.4245
10	54.6305	10	55.4518
20	16 45 04.6579	20	16 50 05.4792
30	14.6852	30	15.5066
40	24.7126	40	25.5340
50	34.7400	50	35.5614
16 43 00	44.7674	16 48 00	45.5887
10	54.7948	10	55.6161
20	16 46 04.8221	20	16 51 05.6435
30	14.8495	30	15.6709
40	24.8769	40	25.6983
50	34.9043	50	35.7256
16 44 00	44.9316	16 49 00	45.7530
10	54.9590	10	55.7804
20	16 47 04.9864	20	16 52 05.8078
30	15.0138	30	15.8352
40	25.0412	40	25.8625
50	35.0685	50	35.8899

Sidereal.	Solar.	Sidereal.	Solar.
16 40 00	16 37 16.1740	16 45 00	16 42 15.3549
10	26.1467	10	25.3276
20	36.1194	20	35.3003
30	46.0921	30	45.2729
40	56.0648	40	55.2456
50	16 38 06.0375	50	16 43 05.2183
16 41 00	16.0102	16 46 00	15.1910
10	25.9829	10	25.1637
20	35.9556	20	35.1364
30	45.9283	30	45.1091
40	55.9009	40	55.0818
50	16 39 05.8736	50	16 44 05.0545
16 42 00	15.8463	16 47 00	15.0272
10	25.8190	10	24.9999
20	35.7917	20	34.9726
30	45.7644	30	44.9453
40	55.7371	40	54.9180
50	16 40 05.7098	50	16 45 04.8907
16 43 00	15.6825	16 48 00	14.8634
10	25.6552	10	24.8361
20	35.6279	20	34.8088
30	45.6006	30	44.7815
40	55.5733	40	54.7542
50	16 41 05.5460	50	16 46 04.7269
16 44 00	15.5187	16 49 00	14.6996
10	25.4914	10	24.6723
20	35.4641	20	34.6450
30	45.4368	30	44.6176
40	55.4095	40	54.5903
50	16 42 05.3822	50	16 47 04.5630

Solar.	Sidereal.	Solar.	Sidereal.
16 50 00	16 52 45.9173	16 55 00	16 57 46.7387
10	55.9447	10	56.7660
20	16 53 05.9721	20	16 58 06.7934
30	15.9994	30	16.8208
40	26.0268	40	26.8482
50	36.0542	50	36.8756
16 51 00	46.0816	16 56 00	46.9029
10	56.1089	10	56.9303
20	16 54 06.1363	20	16 59 06.9577
30	16.1637	30	16.9851
40	26.1911	40	27.0125
50	36.2185	50	37.0398
16 52 00	46.2458	16 57 00	47.0672
10	56.2732	10	57.0946
20	16 55 06.3006	20	17 00 07.1220
30	16.3280	30	17.1494
40	26.3554	40	27.1767
50	36.3827	50	37.2041
16 53 00	46.4101	16 58 00	47.2315
10	56.4375	10	57.2589
20	16 56 06.4649	20	17 01 07.2862
30	16.4923	30	17.3136
40	26.5196	40	27.3410
50	36.5470	50	37.3684
16 54 00	46.5744	16 59 00	47.3958
10	56.6018	10	57.4231
20	16 57 06.6291	20	17 02 07.4505
30	16.6565	30	17.4779
40	26.6839	40	27.5053
50	36.7113	50	37.5327



Sidereal.	Solar.	Sidereal.	Solar.
16 50 00	16 47 14.5357	16 55 00	16 52 13.7166
10	24.5084	10	23.6893
20	34.4811	20	33.6620
30	44.4538	30	43.6347
40	54.4265	40	53.6074
50	16 48 04.3992	50	16 53 03.5801
16 51 00	14.3719	16 56 00	13.5528
10	24.3446	10	23.5255
20	34.3173	20	33.4982
30	44.2900	30	43.4709
40	54.2627	40	53.4436
50	16 49 04.2354	50	16 54 03.4163
16 52 00	14.2081	16 57 00	13.3890
10	24.1808	10	23.3616
20	34.1535	20	33.3343
30	44.1262	30	43.3070
40	54.0989	40	53.2797
50	16 50 04.0716	50	16 55 03.2524
16 53 00	14.0443	16 58 00	13.2251
10	24.0170	10	23.1978
20	33.9896	20	33.1705
30	43.9623	30	43.1432
40	53.9350	40	53.1159
50	16 51 03.9077	50	16 56 03.0886
16 54 00	13.8804	16 59 00	13.0613
10	23.8531	10	23.0340
20	33.8258	20	33.0067
30	43.7985	30	42.9794
40	53.7712	40	52.9521
50	16 52 03.7439	50	16 57 02.9248

Solar.	Sidereal.	Solar.	Sidereal.
17 00 00	17 02 47.5600	17 05 00	17 07 48.3814
10	57.5874	10	58.4088
20	17 03 07.6148	20	17 08 08.4362
30	17.6422	30	18.4635
40	27.6696	40	28.4909
50	37.6969	50	38.5183
17 01 00	47.7243	17 06 00	48.5457
10	57.7517	10	58.5731
20	17 04 07.7791	20	17 09 08.6004
30	17.8065	30	18.6278
40	27.8338	40	28.6552
50	37.8612	50	38.6826
17 02 00	47.8886	17 07 00	48.7100
10	57.9160	10	58.7373
20	17 05 07.9433	20	17 10 08.7647
30	17.9707	30	18.7921
40	27.9981	40	28.8195
50	38.0255	50	38.8469
17 03 00	48.0529	17 08 00	48.8742
10	58.0802	10	58.9016
20	17 06 08.1076	20	17 11 08.9290
30	18.1350	30	18.9564
40	28.1624	40	28.9838
50	38.1898	50	39.0111
17 04 00	48.2171	17 09 00	49.0385
10	58.2445	10	59.0659
20	17 07 08.2719	20	17 12 09.0933
30	18.2993	30	19.1206
40	28.3267	40	29.1480
50	38.3540	50	39.1754

Sidereal.	Solar.	Sidereal.	Solar.
17 00 00	16 57 12.8975	17 05 00	17 02 12.0783
10	22.8702	10	22.0510
20	32.8429	20	32.0237
30	42.8156	30	41.9964
40	52.7883	40	51.9691
50	16 58 02.7610	50	17 03 01.9418
17 01 00	12.7336	17 06 00	11.9145
10	22.7063	10	21.8872
20	32.6790	20	31.8599
30	42.6517	30	41.8326
40	52.6244	40	51.8053
50	16 59 02.5971	50	17 04 01.7780
17 02 00	12.5698	17 07 00	11.7507
10	22.5425	10	21.7234
20	32.5152	20	31.6961
30	42.4879	30	41.6688
40	52.4606	40	51.6415
50	17 00 02.4333	50	17 05 01.6142
17 03 00	12.4060	17 08 00	11.5869
10	22.3787	10	21.5596
20	32.3514	20	31.5323
30	42.3241	30	41.5050
40	52.2968	40	51.4776
50	17 01 02.2695	50	17 06 01.4503
17 04 00	12.2422	17 09 00	11.4230
10	22.2149	10	21.3957
20	32.1876	20	31.3684
30	42.1603	30	41.3411
40	52.1330	40	51.3138
50	17 02 02.1056	50	17 07 01.2865

Solar.	Sidereal.	Solar.	Sidereal.
17 10 00	17 12 49.2028	17 15 00	17 17 50.0242
10	59.2302	10	17 18 00.0515
20	17 13 09.2575	20	10.0789
30	19.2849	30	20.1063
40	29.3123	40	30.1337
50	39.3397	50	40.1611
17 11 00	49.3671	17 16 00	50.1884
10	59.3944	10	17 19 00.2158
20	17 14 09.4218	20	10.2432
30	19.4492	30	20.2706
40	29.4766	40	30.2979
50	39.5040	50	40.3253
17 12 00	49.5313	17 17 00	50.3527
10	59.5587	10	17 20 00.3801
20	17 15 09.5861	20	10.4075
30	19.6135	30	20.4348
40	29.6408	40	30.4622
50	39.6682	50	40.4896
17 13 00	49.6956	17 18 00	50.5170
10	59.7230	10	17 21 00.5444
20	17 16 09.7504	20	10.5717
30	19.7777	30	20.5991
40	29.8051	40	30.6265
50	39.8325	50	40.6539
17 14 00	49.8599	17 19 00	50.6813
10	59.8873	10	17 22 00.7086
20	17 17 09.9146	20	10.7360
30	19.9420	30	20.7634
40	29.9694	40	30.7908
50	39.9968	50	40.8182

Sidereal.	Solar.	Sidereal.	Solar.
17 10 00	17 07 11.2592	17 15 00	17 12 10.4401
10	21.2319	10	20.4128
20	31.2046	20	30.3855
30	41.1773	30	40.3582
40	51.1500	40	50.3309
50	17 08 01.1227	50	17 13 00.3036
17 11 00	11.0954	17 16 00	10.2763
10	21.0681	10	20.2490
20	31.0408	20	30.2216
30	41.0135	30	40.1943
40	50.9862	40	50.1670
50	17 09 00.9589	50	17 14 00.1397
17 12 00	10.9316	17 17 00	10.1124
10	20.9043	10	20.0851
20	30.8770	20	30.0578
30	40.8496	30	40.0305
40	50.8223	40	50.0032
50	17 10 00.7950	50	59.9759
17 13 00	10.7677	17 18 00	17 15 09.9486
10	20.7404	10	19.9213
20	30.7131	20	29.8940
30	40.6858	30	39.8667
40	50.6585	40	49.8394
50	17 11 00.6312	50	59.8121
17 14 00	10.6039	17 19 00	17 16 09.7848
10	20.5766	10	19.7575
20	30.5493	20	29.7302
30	40.5220	30	39.7029
40	50.4947	40	49.6756
50	17 12 00.4674	50	59.6483

Solar.	Sidereal.	Solar.	Sidereal.
17 20 00	17 22 50.8455	17 25 00	17 27 51.6669
10	17 23 00.8729	10	17 28 01.6943
20	10.9003	20	11.7217
30	20.9277	30	21.7490
40	30.9550	40	31.7764
50	40.9824	50	41.8038
17 21 00	51.0098	17 26 00	51.8312
10	17 24 01.0372	10	17 29 01.8586
20	11.0646	20	11.8859
30	21.0919	30	21.9133
40	31.1193	40	31.9407
50	41.1467	50	41.9681
17 22 00	51.1741	17 27 00	51.9955
10	17 25 01.2015	10	17 30 02.0228
20	11.2288	20	12.0502
30	21.2562	30	22.0776
40	31.2836	40	32.1050
50	41.3110	50	42.1323
17 23 00	51.3384	17 28 00	52.1597
10	17 26 01.3657	10	17 31 02.1871
20	11.3931	20	12.2145
30	21.4205	30	22.2419
40	31.4479	40	32.2692
50	41.4752	50	42.2966
17 24 00	51.5026	17 29 00	52.3240
10	17 27 01.5300	10	17 32 02.3514
20	11.5574	20	12.3788
30	21.5848	30	22.4061
40	31.6121	40	32.4335
50	41.6395	50	42.4609

Sidereal.	Solar.	Sidereal.	Solar.
17 20 00	17 17 09.6210	17 25 00	17 22 08.8018
10	19.5936	10	18.7745
20	29.5663	20	28.7472
30	39.5390	30	38.7199
40	49.5117	40	48.6926
50	59.4844	50	58.6653
17 21 00	17 18 09.4571	17 26 00	17 23 08.6380
10	19.4298	10	18.6107
20	29.4025	20	28.5834
30	39.3752	30	38.5561
40	49.3479	40	48.5288
50	59.3206	50	58.5015
17 22 00	17 19 09.2933	17 27 00	17 24 08.4742
10	19.2660	10	18.4469
20	29.2387	20	28.4196
30	39.2114	30	38.3923
40	49.1841	40	48.3650
50	59.1568	50	58.3376
17 23 00	17 20 09.1295	17 28 00	17 25 08.3103
10	19.1022	10	18.2830
20	29.0749	20	28.2557
30	39.0476	30	38.2284
40	49.0203	40	48.2011
50	58.9930	50	58.1738
17 24 00	17 21 08.9656	17 29 00	17 26 08.1465
10	18.9383	10	18.1192
20	28.9110	20	28.0919
30	38.8837	30	38.0646
40	48.8564	40	48.0373
50	58.8291	50	58.0100

Solar.	Sidereal.	Solar.	Sidereal.
17 30 00	17 32 52.4883	17 35 00	17 37 53.3096
10	17 33 02.5157	10	17 38 03.3370
20	12.5430	20	13.3644
30	22.5704	30	23.3918
40	32.5978	40	33.4192
50	42.6252	50	43.4465
17 31 00	52.6525	17 36 00	53.4739
10	17 34 02.6799	10	17 39 03.5013
20	12.7073	20	13.5287
30	22.7347	30	23.5561
40	32.7621	40	33.5834
50	42.7894	50	43.6108
17 32 00	52.8168	17 37 00	53.6382
10	17 35 02.8442	10	17 40 03.6656
20	12.8716	20	13.6930
30	22.8990	30	23.7203
40	32.9263	40	33.7477
50	42.9537	50	43.7751
17 33 00	52.9811	17 38 00	53.8025
10	17 36 03.0085	10	17 41 03.8299
20	13.0359	20	13.8572
30	23.0632	30	23.8846
40	33.0906	40	33.9120
50	43.1180	50	43.9394
17 34 00	53.1454	17 39 00	53.9667
10	17 37 03.1728	10	17 42 03.9941
20	13.2001	20	14.0215
30	23.2275	30	24.0489
40	33.2549	40	34.0763
50	43.2823	50	44.1036



Sidereal.	Solar.	Sidereal.	Solar.
17 30 00	17 27 07.9827	17 35 00	17 32 07.1636
10	17.9554	10	17.1363
20	27.9281	20	27.1090
30	37.9008	30	37.0816
40	47.8735	40	47.0543
50	57.8462	50	57.0270
17 31 00	17 28 07.8189	17 36 00	17 33 06.9997
10	17.7916	10	16.9724
20	27.7643	20	26.9451
30	37.7370	30	36.9178
40	47.7096	40	46.8905
50	57.6823	50	56.8632
17 32 00	17 29 07.6550	17 37 00	17 34 06.8359
10	17.6277	10	16.8086
20	27.6004	20	26.7813
30	37.5731	30	36.7540
40	47.5458	40	46.7267
50	57.5185	50	56.6994
17 33 00	17 30 07.4912	17 38 00	17 35 06.6721
10	17.4639	10	16.6448
20	27.4366	20	26.6175
30	37.4093	30	36.5902
40	47.3820	40	46.5629
50	57.3547	50	56.5356
17 34 00	17 31 07.3274	17 39 00	17 36 06.5083
10	17.3001	10	16.4810
20	27.2728	20	26.4536
30	37.2455	30	36.4263
40	47.2182	40	46.3990
50	57.1909	50	56.3717

Solar.	Sidereal.	Solar.	Sidereal.
17 40 00	17 42 54.1310	17 45 00	17 47 54.9524
10	17 43 04.1584	10	17 48 04.9798
20	14.1858	20	15.0072
30	24.2132	30	25.0345
40	34.2405	40	35.0619
50	44.2679	50	45.0893
17 41 00	54.2953	17 46 00	55.1167
10	17 44 04.3227	10	17 49 05.1440
20	14.3501	20	15.1714
30	24.3774	30	25.1988
40	34.4048	40	35.2262
50	44.4322	50	45.2536
17 42 00	54.4596	17 47 00	55.2809
10	17 45 04.4869	10	17 50 05.3083
20	14.5143	20	15.3357
30	24.5417	30	25.3631
40	34.5691	40	35.3905
50	44.5965	50	45.4178
17 43 00	54.6238	17 48 00	55.4452
10	17 46 04.6512	10	17 51 05.4726
20	14.6786	20	15.5000
30	24.7060	30	25.5274
40	34.7334	40	35.5547
50	44.7607	50	45.5821
17 44 00	54.7881	17 49 00	55.6095
10	17 47 04.8155	10	17 52 05.6369
20	14.8429	20	15.6642
30	24.8703	30	25.6916
40	34.8976	40	35.7190
50	44.9250	50	45.7464

Sidereal.	Solar.	Sidereal.	Solar.
17 40 00	17 37 06.3444	17 45 00	17 42 05.5253
10	16.3171	10	15.4980
20	26.2898	20	25.4707
30	36.2625	30	35.4434
40	46.2352	40	45.4161
50	56.2079	50	55.3888
17 41 00	17 38 06.1806	17 46 00	17 43 05.3615
10	16.1533	10	15.3342
20	26.1260	20	25.3069
30	36.0987	30	35.2796
40	46.0714	40	45.2523
50	56.0441	50	55.2250
17 42 00	17 39 06.0168	17 47 00	17 44 05.1977
10	15.9895	10	15.1703
20	25.9622	20	25.1430
30	35.9349	30	35.1157
40	45.9076	40	45.0884
50	55.8803	50	55.0611
17 43 00	17 40 05.8530	17 48 00	17 45 05.0338
10	15.8257	10	15.0065
20	25.7983	20	24.9792
30	35.7710	30	34.9519
40	45.7437	40	44.9246
50	55.7164	50	54.8973
17 44 00	17 41 05.6891	17 49 00	17 46 04.8700
10	15.6618	10	14.8427
20	25.6345	20	24.8154
30	35.6072	30	34.7881
40	45.5799	40	44.7608
50	55.5526	50	54.7335

Solar.	Sidereal.	Solar.	Sidereal.
17 50 00	17 52 55.7738	17 55 00	17 57 56.5951
10	17 53 05.8011	10	17 58 06.6225
20	15.8285	20	16.6499
30	25.8559	30	26.6773
40	35.8833	40	36.7047
50	45.9107	50	46.7320
17 51 00	55.9380	17 56 00	56.7594
10	17 54 05.9654	10	17 59 06.7868
20	15.9928	20	16.8142
30	26.0202	30	26.8416
40	36.0476	40	36.8689
50	46.0749	50	46.8963
17 52 00	56.1023	17 57 00	56.9237
10	17 55 06.1297	10	18 00 06.9511
20	16.1571	20	16.9784
30	26.1845	30	27.0058
40	36.2118	40	37.0332
50	46.2392	50	47.0606
17 53 00	56.2666	17 58 00	57.0880
10	17 56 06.2940	10	18 01 07.1153
20	16.3213	20	17.1427
30	26.3487	30	27.1701
40	36.3761	40	37.1975
50	46.4035	50	47.2249
17 54 00	56.4309	17 59 00	57.2522
10	17 57 06.4582	10	18 02 07.2796
20	16.4856	20	17.3070
30	26.5130	30	27.3344
40	36.5404	40	37.3618
50	46.5678	50	47.3891

Sidereal.	Solar.	Sidereal.	Solar.
17 50 00	17 47 04.7062	17 55 00	17 52 03.8870
10	14.6789	10	13.8597
20	24.6516	20	23.8324
30	34.6243	30	33.8051
40	44.5970	40	43.7778
50	54.5697	50	53.7505
17 51 00	17 48 04.5423	17 56 00	17 53 03.7232
10	14.5150	10	13.6959
20	24.4877	20	23.6686
30	34.4604	30	33.6413
40	44.4331	40	43.6140
50	54.4058	50	53.5867
17 52 00	17 49 04.3785	17 57 00	17 54 03.5594
10	14.3512	10	13.5321
20	24.3239	20	23.5048
30	34.2966	30	33.4775
40	44.2693	40	43.4502
50	54.2420	50	53.4229
17 53 00	17 50 04.2147	17 58 00	17 55 03.3956
10	14.1874	10	13.3683
20	24.1601	20	23.3410
30	34.1328	30	33.3137
40	44.1055	40	43.2863
50	54.0782	50	53.2590
17 54 00	17 51 04.0509	17 59 00	17 56 03.2317
10	14.0236	10	13.2044
20	23.9963	20	23.1771
30	33.9690	30	33.1498
40	43.9417	40	43.1225
50	53.9143	50	53.0952

Solar.	Sidereal.	Solar.	Sidereal.
18 00 00	18 02 57.4165	18 05 00	18 07 58.2379
10	18 03 07.4439	10	18 08 08.2653
20	17.4713	20	18.2926
30	27.4986	30	28.3200
40	37.5260	40	38.3474
50	47.5534	50	48.3748
18 01 00	57.5808	18 06 00	58.4022
10	18 04 07.6082	10	18 09 08.4295
20	17.6355	20	18.4569
30	27.6629	30	28.4843
40	37.6903	40	38.5117
50	47.7177	50	48.5391
18 02 00	57.7451	18 07 00	58.5664
10	18 05 07.7724	10	18 10 08.5938
20	17.7998	20	18.6212
30	27.8272	30	28.6486
40	37.8546	40	38.6759
50	47.8820	50	48.7033
18 03 00	57.9093	18 08 00	58.7307
10	18 06 07.9367	10	18 11 08.7581
20	17.9641	20	18.7855
30	27.9915	30	28.8128
40	38.0189	40	38.8402
50	48.0462	50	48.8676
18 04 00	58.0736	18 09 00	58.8950
10	18 07 08.1010	10	18 12 08.9224
20	18.1284	20	18.9497
30	28.1557	30	28.9771
40	38.1831	40	39.0045
50	48.2105	50	49.0319

Sidereal.	Solar.	Sidereal.	Solar.
18 00 00	17 57 03.0679	18 05 00	18 02 02.2488
10	13.0406	10	12.2215
20	23.0133	20	22.1942
30	32.9860	30	32.1669
40	42.9587	40	42.1396
50	52.9314	50	52.1123
18 01 00	17 58 02.9041	18 06 00	18 03 02.0850
10	12.8768	10	12.0577
20	22.8495	20	22.0303
30	32.8222	30	32.0030
40	42.7949	40	41.9757
50	52.7676	50	51.9484
18 02 00	17 59 02.7403	18 07 00	18 04 01.9211
10	12.7130	10	11.8938
20	22.6857	20	21.8665
30	32.6583	30	31.8392
40	42.6310	40	41.8119
50	52.6037	50	51.7846
18 03 00	18 00 02.5764	18 08 00	18 05 01.7573
10	12.5491	10	11.7300
20	22.5218	20	21.7027
30	32.4945	30	31.6754
40	42.4672	40	41.6481
50	52.4399	50	51.6208
18 04 00	18 01 02.4126	18 09 00	18 06 01.5935
10	12.3853	10	11.5662
20	22.3580	20	21.5389
30	32.3307	30	31.5116
40	42.3034	40	41.4843
50	52.2761	50	51.4570

Solar.	Sidereal.	Solar.	Sidereal.
18 10 00	18 12 59.0593	18 15 00	18 17 59.8806
10	18 13 09.0866	10	18 18 09.9080
20	19.1140	20	19.9354
30	29.1414	30	29.9628
40	39.1688	40	39.9901
50	49.1962	50	50.0175
18 11 00	59.2235	18 16 00	18 19 00.0449
10	18 14 09.2509	10	10.0723
20	19.2783	20	20.0997
30	29.3057	30	30.1270
40	39.3330	40	40.1544
50	49.3604	50	50.1818
18 12 00	59.3878	18 17 00	18 20 00.2092
10	18 15 09.4152	10	10.2366
20	19.4426	20	20.2639
30	29.4699	30	30.2913
40	39.4973	40	40.3187
50	49.5247	50	50.3461
18 13 00	59.5521	18 18 00	18 21 00.3735
10	18 16 09.5795	10	10.4008
20	19.6068	20	20.4282
30	29.6342	30	30.4556
40	39.6616	40	40.4830
50	49.6890	50	50.5103
18 14 00	59.7164	18 19 00	18 22 00.5377
10	18 17 09.7437	10	10.5651
20	19.7711	20	20.5925
30	29.7985	30	30.6199
40	39.8259	40	40.6472
50	49.8533	50	50.6746



Sidereal.	Solar.	Sidereal.	Solar.
18 10 00	18 07 01.4297	18 15 00	18 12 00.6105
10	11.4023	10	10.5832
20	21.3750	20	20.5559
30	31.3477	30	30.5286
40	41.3204	40	40.5013
50	51.2931	50	50.4740
18 11 00	18 08 01.2658	18 16 00	18 13 00.4467
10	11.2385	10	10.4194
20	21.2112	20	20.3921
30	31.1839	30	30.3648
40	41.1566	40	40.3375
50	51.1293	50	50.3102
18 12 00	18 09 01.1020	18 17 00	18 14 00.2829
10	11.0747	10	10.2556
20	21.0474	20	20.2283
30	31.0201	30	30.2010
40	40.9928	40	40.1737
50	50.9655	50	50.1463
18 13 00	18 10 00.9382	18 18 00	18 15 00.1190
10	10.9109	10	10.0917
20	20.8836	20	20.0644
30	30.8563	30	30.0371
40	40.8290	40	40.0098
50	50.8017	50	49.9825
18 14 00	18 11 00.7743	18 19 00	59.9552
10	10.7470	10	18 16 09.9279
20	20.7197	20	19.9006
30	30.6924	30	29.8733
40	40.6651	40	39.8460
50	50.6378	50	49.8187

Solar.	Sidereal.	Solar.	Sidereal.
18 20 00	18 23 00.7020	18 25 00	18 28 01.5234
10	10.7294	10	11.5508
20	20.7568	20	21.5781
30	30.7841	30	31.6055
40	40.8115	40	41.6329
50	50.8389	50	51.6603
18 21 00	18 24 00.8663	18 26 00	18 29 01.6876
10	10.8937	10	11.7150
20	20.9210	20	21.7424
30	30.9484	30	31.7698
40	40.9758	40	41.7972
50	51.0032	50	51.8245
18 22 00	18 25 01.0306	18 27 00	18 30 01.8519
10	11.0579	10	11.8793
20	21.0853	20	21.9067
30	31.1127	30	31.9341
40	41.1401	40	41.9614
50	51.1674	50	51.9888
18 23 00	18 26 01.1948	18 28 00	18 31 02.0162
10	11.2222	10	12.0436
20	21.2496	20	22.0710
30	31.2770	30	32.0983
40	41.3043	40	42.1257
50	51.3317	50	52.1531
18 24 00	18 27 01.3591	18 29 00	18 32 02.1805
10	11.3865	10	12.2079
20	21.4139	20	22.2352
30	31.4412	30	32.2626
40	41.4686	40	42.2900
50	51.4960	50	52.3174

Sidereal.	Solar.	Sidereal.	Solar.
18 20 00	18 16 59.7914	18 25 00	18 21 58.9723
10	18 17 09.7641	10	18 22 08.9450
20	19.7368	20	18.9177
30	29.7095	30	28.8903
40	39.6822	40	38.8630
50	49.6549	50	48.8357
18 21 00	59.6276	18 26 00	58.8084
10	18 18 09.6003	10	18 23 08.7811
20	19.5730	20	18.7538
30	29.5457	30	28.7265
40	39.5183	40	38.6992
50	49.4910	50	48.6719
18 22 00	59.4637	18 27 00	58.6446
10	18 19 09.4364	10	18 24 08.6173
20	19.4091	20	18.5900
30	29.3818	30	28.5627
40	39.3545	40	38.5354
50	49.3272	50	48.5081
18 23 00	59.2999	18 28 00	58.4808
10	18 20 09.2726	10	18 25 08.4535
20	19.2453	20	18.4262
30	29.2180	30	28.3989
40	39.1907	40	38.3716
50	49.1634	50	48.3443
18 24 00	59.1361	18 29 00	58.3170
10	18 21 09.1088	10	18 26 08.2897
20	19.0815	20	18.2623
30	29.0542	30	28.2350
40	39.0269	40	38.2077
50	48.9996	50	48.1804

Solar.	Sidereal.	Solar.	Sidereal.
18 30 00	18 33 02.3447	18 35 00	18 38 03.1661
10	12.3721	10	13.1935
20	22.3995	20	23.2209
30	32.4269	30	33.2483
40	42.4543	40	43.2756
50	52.4816	50	53.3030
18 31 00	18 34 02.5090	18 36 00	18 39 03.3304
10	12.5364	10	13.3578
20	22.5638	20	23.3852
30	32.5912	30	33.4125
40	42.6185	40	43.4399
50	52.6459	50	53.4673
18 32 00	18 35 02.6733	18 37 00	18 40 03.4947
10	12.7007	10	13.5220
20	22.7281	20	23.5494
30	32.7554	30	33.5768
40	42.7828	40	43.6042
50	52.8102	50	53.6316
18 33 00	18 36 02.8376	18 38 00	18 41 03.6589
10	12.8650	10	13.6863
20	22.8923	20	23.7137
30	32.9197	30	33.7411
40	42.9471	40	43.7685
50	52.9745	50	53.7958
18 34 00	18 37 03.0018	18 39 00	18 42 03.8232
10	13.0292	10	13.8506
20	23.0566	20	23.8780
30	33.0840	30	33.9054
40	43.1114	40	43.9327
50	53.1387	50	53.9601

Sidereal.	Solar.	Sidereal.	Solar.
18 30 00	18 26 58.1531	18 35 00	18 31 57.3340
10	18 27 08.1258	10	18 32 07.3067
20	18.0985	20	17.2794
30	28.0712	30	27.2521
40	38.0439	40	37.2248
50	48.0166	50	47.1975
18 31 00	57.9893	18 36 00	57.1702
10	18 28 07.9620	10	18 33 07.1429
20	17.9347	20	17.1156
30	27.9074	30	27.0883
40	37.8801	40	37.0610
50	47.8528	50	47.0337
18 32 00	57.8255	18 37 00	57.0064
10	18 29 07.7982	10	18 34 06.9790
20	17.7709	20	16.9517
30	27.7436	30	26.9244
40	37.7163	40	36.8971
50	47.6890	50	46.8698
18 33 00	57.6617	18 38 00	56.8425
10	18 30 07.6343	10	18 35 06.8152
20	17.6070	20	16.7879
30	27.5797	30	26.7606
40	37.5524	40	36.7333
50	47.5251	50	46.7060
18 34 00	57.4978	18 39 00	56.6787
10	18 31 07.4705	10	18 36 06.6514
20	17.4432	20	16.6241
30	27.4159	30	26.5968
40	37.3886	40	36.5695
50	47.3613	50	46.5422

Solar.	Sidereal.	Solar.	Sidereal.
18 40 00	18 43 03.9875	18 45 00	18 48 04.8089
10	14.0149	10	14.8362
20	24.0423	20	24.8636
30	34.0696	30	34.8910
40	44.0970	40	44.9184
50	54.1244	50	54.9458
18 41 00	18 44 04.1518	18 46 00	18 49 04.9731
10	14.1791	10	15.0005
20	24.2065	20	25.0279
30	34.2339	30	35.0553
40	44.2613	40	45.0827
50	54.2887	50	55.1100
18 42 00	18 45 04.3160	18 47 00	18 50 05.1374
10	14.3434	10	15.1648
20	24.3708	20	25.1922
30	34.3982	30	35.2196
40	44.4256	40	45.2469
50	54.4529	50	55.2743
18 43 00	18 46 04.4803	18 48 00	18 51 05.3017
10	14.5077	10	15.3291
20	24.5351	20	25.3564
30	34.5625	30	35.3838
40	44.5898	40	45.4112
50	54.6172	50	55.4386
18 44 00	18 47 04.6446	18 49 00	18 52 05.4660
10	14.6720	10	15.4933
20	24.6993	20	25.5207
30	34.7267	30	35.5481
40	44.7541	40	45.5755
50	54.7815	50	55.6029

Sidereal.	Solar.	Sidereal.	Solar.
18 40 00	18 36 56.5149	18 45 00	18 41 55.6957
10	18 37 06.4876	10	18 42 05.6684
20	16.4603	20	15.6411
30	26.4330	30	25.6138
40	36.4057	40	35.5865
50	46.3784	50	45.5592
18 41 00	56.3510	18 46 00	55.5319
10	18 38 06.3237	10	18 43 05.5046
20	16.2964	20	15.4773
30	26.2691	30	25.4500
40	36.2418	40	35.4227
50	46.2145	50	45.3954
18 42 00	56.1872	18 47 00	55.3681
10	18 39 06.1599	10	18 44 05.3408
20	16.1326	20	15.3135
30	26.1053	30	25.2862
40	36.0780	40	35.2589
50	46.0507	50	45.2316
18 43 00	56.0234	18 48 00	55.2043
10	18 40 05.9961	10	18 45 05.1770
20	15.9688	20	15.1497
30	25.9415	30	25.1224
40	35.9142	40	35.0950
50	45.8869	50	45.0677
18 44 00	55.8596	18 49 00	55.0404
10	18 41 05.8323	10	18 46 05.0131
20	15.8050	20	14.9858
30	25.7777	30	24.9585
40	35.7504	40	34.9312
50	45.7230	50	44.9039

Solar.	Sidereal.	Solar.	Sidereal.
18 50 00	18 53 05.6302	18 55 00	18 58 06.4516
10	15.6576	10	16.4790
20	25.6850	20	26.5064
30	35.7124	30	36.5337
40	45.7398	40	46.5611
50	55.7671	50	56.5885
18 51 00	18 54 05.7945	18 56 00	18 59 06.6159
10	15.8219	10	16.6433
20	25.8493	20	26.6706
30	35.8767	30	36.6980
40	45.9040	40	46.7254
50	55.9314	50	56.7528
18 52 00	18 55 05.9588	18 57 00	19 00 06.7802
10	15.9862	10	16.8075
20	26.0135	20	26.8349
30	36.0409	30	36.8623
40	46.0683	40	46.8897
50	56.0957	50	56.9171
18 53 00	18 56 06.1231	18 58 00	19 01 06.9444
10	16.1504	10	16.9718
20	26.1778	20	26.9992
30	36.2052	30	37.0266
40	46.2326	40	47.0540
50	56.2600	50	57.0813
18 54 00	18 57 06.2873	18 59 00	19 02 07.1087
10	16.3147	10	17.1361
20	26.3421	20	27.1635
30	36.3695	30	37.1908
40	46.3969	40	47.2182
50	56.4242	50	57.2456



Sidereal.	Solar.	Sidereal.	Solar.
18 50 00	18 46 54.8766	18 55 00	18 51 54.0575
10	18 47 04.8493	10	18 52 04.0302
20	14.8220	20	14.0029
30	24.7947	30	23.9756
40	34.7674	40	33.9483
50	44.7401	50	43.9210
18 51 00	54.7128	18 56 00	53.8937
10	18 48 04.6855	10	18 53 03.8664
20	14.6582	20	13.8390
30	24.6309	30	23.8117
40	34.6036	40	33.7844
50	44.5763	50	43.7571
18 52 00	54.5490	18 57 00	53.7298
10	18 49 04.5217	10	18 54 03.7025
20	14.4944	20	13.6752
30	24.4670	30	23.6479
40	34.4397	40	33.6206
50	44.4124	50	43.5933
18 53 00	54.3851	18 58 00	53.5660
10	18 50 04.3578	10	18 55 03.5387
20	14.3305	20	13.5114
30	24.3032	30	23.4841
40	34.2759	40	33.4568
50	44.2486	50	43.4295
18 54 00	54.2213	18 59 00	53.4022
10	18 51 04.1940	10	18 56 03.3749
20	14.1667	20	13.3476
30	24.1394	30	23.3203
40	34.1121	40	33.2930
50	44.0848	50	43.2657

Solar.	Sidereal.	Solar.	Sidereal.
19 00 00	19 03 07.2730	19 05 00	19 08 08.0944
10	17.3004	10	18.1217
20	27.3277	20	28.1491
30	37.3551	30	38.1765
40	47.3825	40	48.2039
50	57.4099	50	58.2313
19 01 00	19 04 07.4373	19 06 00	19 09 08.2586
10	17.4646	10	18.2860
20	27.4920	20	28.3134
30	37.5194	30	38.3408
40	47.5468	40	48.3681
50	57.5742	50	58.3955
19 02 00	19 05 07.6015	19 07 00	19 10 08.4229
10	17.6289	10	18.4503
20	27.6563	20	28.4777
30	37.6837	30	38.5050
40	47.7110	40	48.5324
50	57.7384	50	58.5598
19 03 00	19 06 07.7658	19 08 00	19 11 08.5872
10	17.7932	10	18.6146
20	27.8206	20	28.6419
30	37.8479	30	38.6693
40	47.8753	40	48.6967
50	57.9027	50	58.7241
19 04 00	19 07 07.9301	19 09 00	19 12 08.7515
10	17.9575	10	18.7788
20	27.9848	20	28.8062
30	38.0122	30	38.8336
40	48.0396	40	48.8610
50	58.0670	50	58.8884

Sidereal.	Solar.	Sidereal.	Solar.
19 00 00	18 56 53.2384	19 05 00	19 01 52.4192
10	18 57 03.2110	10	19 02 02.3919
20	13.1837	20	12.3646
30	23.1564	30	22.3373
40	33.1291	40	32.3100
50	43.1018	50	42.2827
19 01 00	53.0745	19 06 00	52.2554
10	18 58 03.0472	10	19 03 02.2281
20	13.0199	20	12.2008
30	22.9926	30	22.1735
40	32.9653	40	32.1462
50	42.9380	50	42.1189
19 02 00	52.9107	19 07 00	52.0916
10	18 59 02.8834	10	19 04 02.0643
20	12.8561	20	12.0370
30	22.8288	30	22.0097
40	32.8015	40	31.9824
50	42.7742	50	41.9550
19 03 00	52.7469	19 08 00	51.9277
10	19 00 02.7196	10	19 05 01.9004
20	12.6923	20	11.8731
30	22.6650	30	21.8458
40	32.6377	40	31.8185
50	42.6104	50	41.7912
19 04 00	52.5830	19 09 00	51.7639
10	19 01 02.5557	10	19 06 01.7366
20	12.5284	20	11.7093
30	22.5011	30	21.6820
40	32.4738	40	31.6547
50	42.4465	50	41.6274

Solar.	Sidereal.	Solar.	Sidereal.
19 10 00	19 13 08.9157	19 15 00	19 18 09.7371
10	18.9431	10	19.7645
20	28.9705	20	29.7919
30	38.9979	30	39.8192
40	49.0252	40	49.8466
50	59.0526	50	59.8740
19 11 00	19 14 09.0800	19 16 00	19 19 09.9014
10	19.1074	10	19.9288
20	29.1348	20	29.9561
30	39.1621	30	39.9835
40	49.1895	40	50.0109
50	59.2169	50	19 20 00.0383
19 12 00	19 15 09.2443	19 17 00	10.0657
10	19.2717	10	20.0930
20	29.2990	20	30.1204
30	39.3264	30	40.1478
40	49.3538	40	50.1752
50	59.3812	50	19 21 00.2025
19 13 00	19 16 09.4086	19 18 00	10.2299
10	19.4359	10	20.2573
20	29.4633	20	30.2847
30	39.4907	30	40.3121
40	49.5181	40	50.3394
50	59.5454	50	19 22 00.3668
19 14 00	19 17 09.5728	19 19 00	10.3942
10	19.6002	10	20.4216
20	29.6276	20	30.4490
30	39.6550	30	40.4763
40	49.6823	40	50.5037
50	59.7097	50	19 23 00.5311

Sidereal.	Solar.	Sidereal.	Solar.
19 10 00	19 06 51.6001	19 15 00	19 11 50.7810
10	19 07 01.5728	10	19 12 00.7537
20	11.5455	20	10.7264
30	21.5182	30	20.6990
40	31.4909	40	30.6717
50	41.4636	50	40.6444
19 11 00	51.4363	19 16 00	50.6171
10	19 08 01.4090	10	19 13 00.5898
20	11.3817	20	10.5625
30	21.3544	30	20.5352
40	31.3270	40	30.5079
50	41.2997	50	40.4806
19 12 00	51.2724	19 17 00	50.4533
10	19 09 01.2451	10	19 14 00.4260
20	11.2178	20	10.3987
30	21.1905	30	20.3714
40	31.1632	40	30.3441
50	41.1359	50	40.3168
19 13 00	51.1086	19 18 00	50.2895
10	19 10 01.0813	10	19 15 00.2622
20	11.0540	20	10.2349
30	21.0267	30	20.2076
40	30.9994	40	30.1803
50	40.9721	50	40.1530
19 14 00	50.9448	19 19 00	50.1257
10	19 11 00.9175	10	19 16 00.0984
20	10.8902	20	10.0710
30	20.8629	30	20.0437
40	30.8356	40	30.0164
50	40.8083	50	39.9891

Solar.	Sidereal.	Solar.	Sidereal.
19 20 00	19 23 10.5585	19 25 00	19 28 11.3798
10	20.5859	10	21.4072
20	30.6132	20	31.4346
30	40.6406	30	41.4620
40	50.6680	40	51.4894
50	19 24 00.6954	50	19 29 01.5167
19 21 00	10.7227	19 26 00	11.5441
10	20.7501	10	21.5715
20	30.7775	20	31.5989
30	40.8049	30	41.6263
40	50.8323	40	51.6536
50	19 25 00.8596	50	19 30 01.6810
19 22 00	10.8870	19 27 00	11.7084
10	20.9144	10	21.7358
20	30.9418	20	31.7632
30	40.9692	30	41.7905
40	50.9965	40	51.8179
50	19 26 01.0239	50	19 31 01.8453
19 23 00	11.0513	19 28 00	11.8727
10	21.0787	10	21.9001
20	31.1061	20	31.9274
30	41.1334	30	41.9548
40	51.1608	40	51.9822
50	19 27 01.1882	50	19 32 02.0096
19 24 00	11.2156	19 29 00	12.0369
10	21.2430	10	22.0643
20	31.2703	20	32.0917
30	41.2977	30	42.1191
40	51.3251	40	52.1465
50	19 28 01.3525	50	19 33 02.1738

Sidereal.	Solar.	Sidereal.	Solar.
19 20 00	19 16 49.9618	19 25 00	19 21 49.1427
10	59.9345	10	59.1154
20	19 17 09.9072	20	19 22 09.0881
30	19.8799	30	19.0608
40	29.8526	40	29.0335
50	39.8253	50	39.0062
19 21 00	49.7980	19 26 00	48.9789
10	59.7707	10	58.9516
20	19 18 09.7434	20	19 23 08.9243
30	19.7161	30	18.8970
40	29.6888	40	28.8697
50	39.6615	50	38.8424
19 22 00	49.6342	19 27 00	48.8150
10	59.6069	10	58.7877
20	19 19 09.5796	20	19 24 08.7604
30	19.5523	30	18.7331
40	29.5250	40	28.7058
50	39.4977	50	38.6785
19 23 00	49.4704	19 28 00	48.6512
10	59.4430	10	58.6239
20	19 20 09.4157	20	19 25 08.5966
30	19.3884	30	18.5693
40	29.3611	40	28.5420
50	39.3338	50	38.5147
19 24 00	49.3065	19 29 00	48.4874
10	59.2792	10	58.4601
20	19 21 09.2519	20	19 26 08.4328
30	19.2246	30	18.4055
40	29.1973	40	28.3782
50	39.1700	50	38.3509

Solar.	Sidereal.	Solar.	Sidereal.
19 30 00	19 33 12.2012	19 35 00	19 38 13.0226
10	22.2286	10	23.0500
20	32.2560	20	33.0774
30	42.2834	30	43.1047
40	52.3107	40	53.1321
50	19 34 02.3381	50	19 39 03.1595
19 31 00	12.3655	19 36 00	13.1869
10	22.3929	10	23.2142
20	32.4203	20	33.2416
30	42.4476	30	43.2690
40	52.4750	40	53.2964
50	19 35 02.5024	50	19 40 03.3238
19 32 00	12.5298	19 37 00	13.3511
10	22.5571	10	23.3785
20	32.5845	20	33.4059
30	42.6119	30	43.4333
40	52.6393	40	53.4607
50	19 36 02.6667	50	19 41 03.4880
19 33 00	12.6940	19 38 00	13.5154
10	22.7214	10	23.5428
20	32.7488	20	33.5702
30	42.7762	30	43.5976
40	52.8036	40	53.6249
50	19 37 02.8309	50	19 42 03.6523
19 34 00	12.8583	19 39 00	13.6797
10	22.8857	10	23.7071
20	32.9131	20	33.7344
30	42.9405	30	43.7618
40	52.9678	40	53.7892
50	19 38 02.9952	50	19 43 03.8166



Sidereal.	Solar.	Sidereal.	Solar.
19 30 00	19 26 48.3236	19 35 00	19 31 47.5044
10	58.2963	10	57.4771
20	19 27 08.2690	20	19 32 07.4498
30	18.2417	30	17.4225
40	28.2144	40	27.3952
50	38.1871	50	37.3679
19 31 00	48.1597	19 36 00	47.3406
10	58.1324	10	57.3133
20	19 28 08.1051	20	19 33 07.2860
30	18.0778	30	17.2587
40	28.0505	40	27.2314
50	38.0232	50	37.2041
19 32 00	47.9959	19 37 00	47.1768
10	57.9686	10	57.1495
20	19 29 07.9413	20	19 34 07.1222
30	17.9140	30	17.0949
40	27.8867	40	27.0676
50	37.8594	50	37.0403
19 33 00	47.8321	19 38 00	47.0130
10	57.8048	10	56.9857
20	19 30 07.7775	20	19 35 06.9584
30	17.7502	30	16.9311
40	27.7229	40	26.9037
50	37.6956	50	36.8764
19 34 00	47.6683	19 39 00	46.8491
10	57.6410	10	56.8218
20	19 31 07.6137	20	19 36 06.7945
30	17.5864	30	16.7672
40	27.5591	40	26.7399
50	37.5317	50	36.7126

Solar.	Sidereal.	Solar.	Sidereal.
19 40 00	19 43 13.8440	19 45 00	19 48 14.6653
10	23.8713	10	24.6927
20	33.8987	20	34.7201
30	43.9261	30	44.7475
40	53.9535	40	54.7749
50	19 44 03.9809	50	19 49 04.8022
19 41 00	14.0082	19 46 00	14.8296
10	24.0356	10	24.8570
20	34.0630	20	34.8844
30	44.0904	30	44.9118
40	54.1178	40	54.9391
50	19 45 04.1451	50	19 50 04.9665
19 42 00	14.1725	19 47 00	14.9939
10	24.1999	10	25.0213
20	34.2273	20	35.0486
30	44.2547	30	45.0760
40	54.2820	40	55.1034
50	19 46 04.3094	50	19 51 05.1308
19 43 00	14.3368	19 48 00	15.1582
10	24.3642	10	25.1855
20	34.3915	20	35.2129
30	44.4189	30	45.2403
40	54.4463	40	55.2677
50	19 47 04.4737	50	19 52 05.2951
19 44 00	14.5011	19 49 00	15.3224
10	24.5284	10	25.3498
20	34.5558	20	35.3772
30	44.5832	30	45.4046
40	54.6106	40	55.4320
50	19 48 04.6380	50	19 53 05.4593

Sidereal.	Solar.	Sidereal.	Solar.
19 40 00	19 36 46.6853	19 45 00	19 41 45.8662
10	56.6580	10	55.8389
20	19 37 06.6307	20	19 42 05.8116
30	16.6034	30	15.7843
40	26.5761	40	25.7570
50	36.5488	50	35.7297
19 41 00	46.5215	19 46 00	45.7024
10	56.4942	10	55.6751
20	19 38 06.4669	20	19 43 05.6477
30	16.4396	30	15.6204
40	26.4123	40	25.5931
50	36.3850	50	35.5658
19 42 00	46.3577	19 47 00	45.5385
10	56.3304	10	55.5112
20	19 39 06.3031	20	19 44 05.4839
30	16.2757	30	15.4566
40	26.2484	40	25.4293
50	36.2211	50	35.4020
19 43 00	46.1938	19 48 00	45.3747
10	56.1665	10	55.3474
20	19 40 06.1392	20	19 45 05.3201
30	16.1119	30	15.2928
40	26.0846	40	25.2655
50	36.0573	50	35.2382
19 44 00	46.0300	19 49 00	45.2109
10	56.0027	10	55.1836
20	19 41 05.9754	20	19 46 05.1563
30	15.9481	30	15.1290
40	25.9208	40	25.1017
50	35.8935	50	35.0744

Solar.	Sidereal.	Solar.	Sidereal.
19 50 00	19 53 15.4867	19 55 00	19 58 16.3081
10	25.5141	10	26.3355
20	35.5415	20	36.3628
30	45.5688	30	46.3902
40	55.5962	40	56.4176
50	19 54 05.6236	50	19 59 06.4450
19 51 00	15.6510	19 56 00	16.4724
10	25.6784	10	26.4997
20	35.7057	20	36.5271
30	45.7331	30	46.5545
40	55.7605	40	56.5819
50	19 55 05.7879	50	20 00 06.6093
19 52 00	15.8153	19 57 00	16.6366
10	25.8426	10	26.6640
20	35.8700	20	36.6914
30	45.8974	30	46.7188
40	55.9248	40	56.7461
50	19 56 05.9522	50	20 01 06.7735
19 53 00	15.9795	19 58 00	16.8009
10	26.0069	10	26.8283
20	36.0343	20	36.8557
30	46.0617	30	46.8830
40	56.0891	40	56.9104
50	19 57 06.1164	50	20 02 06.9378
19 54 00	16.1438	19 59 00	16.9652
10	26.1712	10	26.9926
20	36.1986	20	37.0199
30	46.2259	30	47.0473
40	56.2533	40	57.0747
50	19 58 06.2807	50	20 03 07.1021

Sidereal.	Solar.	Sidereal.	Solar.
19 50 00	19 46 45.0471	19 55 00	19 51 44.2279
10	55.0197	10	54.2006
20	19 47 04.9924	20	19 52 04.1733
30	14.9651	30	14.1460
40	24.9378	40	24.1187
50	34.9105	50	34.0914
19 51 00	44.8832	19 56 00	44.0641
10	54.8559	10	54.0368
20	19 48 04.8286	20	19 53 04.0095
30	14.8013	30	13.9822
40	24.7740	40	23.9549
50	34.7467	50	33.9276
19 52 00	44.7194	19 57 00	43.9003
10	54.6921	10	53.8730
20	19 49 04.6648	20	19 54 03.8457
30	14.6375	30	13.8184
40	24.6102	40	23.7911
50	34.5829	50	33.7637
19 53 00	44.5556	19 58 00	43.7364
10	54.5283	10	53.7091
20	19 50 04.5010	20	19 55 03.6818
30	14.4737	30	13.6545
40	24.4464	40	23.6272
50	34.4191	50	33.5999
19 54 00	44.3917	19 59 00	43.5726
10	54.3644	10	53.5453
20	19 51 04.3371	20	19 56 03.5180
30	14.3098	30	13.4907
40	24.2825	40	23.4634
50	34.2552	50	33.4361

Solar.	Sidereal.	Solar.	Sidereal.
20 00 00	20 03 17.1295	20 05 00	20 08 17.9508
10	27.1568	10	27.9782
20	37.1842	20	38.0056
30	47.2116	30	48.0330
40	57.2390	40	58.0603
50	20 04 07.2664	50	20 09 08.0877
20 01 00	17.2937	20 06 00	18.1151
10	27.3211	10	28.1425
20	37.3485	20	38.1699
30	47.3759	30	48.1972
40	57.4032	40	58.2246
50	20 05 07.4306	50	20 10 08.2520
20 02 00	17.4580	20 07 00	18.2794
10	27.4854	10	28.3068
20	37.5128	20	38.3341
30	47.5401	30	48.3615
40	57.5675	40	58.3889
50	20 06 07.5949	50	20 11 08.4163
20 03 00	17.6223	20 08 00	18.4437
10	27.6497	10	28.4710
20	37.6770	20	38.4984
30	47.7044	30	48.5258
40	57.7318	40	58.5532
50	20 07 07.7592	50	20 12 08.5805
20 04 00	17.7866	20 09 00	18.6079
10	27.8139	10	28.6353
20	37.8413	20	38.6627
30	47.8687	30	48.6901
40	57.8961	40	58.7174
50	20 08 07.9235	50	20 13 08.7448

Sidereal.	Solar.	Sidereal.	Solar.
20 00 00	19 56 43.4088	20 05 00	20 01 42.5897
10	53.3815	10	52.5624
20	19 57 03.3542	20	20 02 02.5351
30	13.3269	30	12.5077
40	23.2996	40	22.4804
50	33.2723	50	32.4531
20 01 00	43.2450	20 06 00	42.4258
10	53.2177	10	52.3985
20	19 58 03.1904	20	20 03 02.3712
30	13.1631	30	12.3439
40	23.1357	40	22.3166
50	33.1084	50	32.2893
20 02 00	43.0811	20 07 00	42.2620
10	53.0538	10	52.2347
20	19 59 03.0265	20	20 04 02.2074
30	12.9992	30	12.1801
40	22.9719	40	22.1528
50	32.9446	50	32.1255
20 03 00	42.9173	20 08 00	42.0982
10	52.8900	10	52.0709
20	20 00 02.8627	20	20 05 02.0436
30	12.8354	30	12.0163
40	22.8081	40	21.9890
50	32.7808	50	31.9617
20 04 00	42.7535	20 09 00	41.9344
10	52.7262	10	51.9071
20	20 01 02.6989	20	20 06 01.8797
30	12.6716	30	11.8524
40	22.6443	40	21.8251
50	32.6170	50	31.7978

Solar.	Sidereal.	Solar.	Sidereal.
20 10 00	20 13 18.7722	20 15 00	20 18 19.5936
10	28.7996	10	29.6210
20	38.8270	20	39.6483
30	48.8543	30	49.6757
40	58.8817	40	59.7031
50	20 14 08.9091	50	20 19 09.7305
20 11 00	18.9365	20 16 00	19.7579
10	28.9639	10	29.7852
20	38.9912	20	39.8126
30	49.0186	30	49.8400
40	59.0460	40	59.8674
50	20 15 09.0734	50	20 20 09.8947
20 12 00	19.1008	20 17 00	19.9221
10	29.1281	10	29.9495
20	39.1555	20	39.9769
30	49.1829	30	50.0043
40	59.2103	40	20 21 00.0316
50	20 16 09.2376	50	10.0590
20 13 00	19.2650	20 18 00	20.0864
10	29.2924	10	30.1138
20	39.3198	20	40.1412
30	49.3472	30	50.1685
40	59.3745	40	20 22 00.1959
50	20 17 09.4019	50	10.2233
20 14 00	19.4293	20 19 00	20.2507
10	29.4567	10	30.2781
20	39.4841	20	40.3054
30	49.5114	30	50.3328
40	59.5388	40	20 23 00.3602
50	20 18 09.5662	50	10.3876



Sidereal.	Solar.	Sidereal.	Solar.
20 10 00	20 06 41.7705	20 15 00	20 11 40.9514
10	51.7432	10	50.9241
20	20 07 01.7159	20	20 12 00.8968
30	11.6886	30	10.8695
40	21.6613	40	20.8422
50	31.6340	50	30.8149
20 11 00	41.6067	20 16 00	40.7876
10	51.5794	10	50.7603
20	20 08 01.5521	20	20 13 00.7330
30	11.5248	30	10.7057
40	21.4975	40	20.6784
50	31.4702	50	30.6511
20 12 00	41.4429	20 17 00	40.6237
10	51.4156	10	50.5964
20	20 09 01.3883	20	20 14 00.5691
30	11.3610	30	10.5418
40	21.3337	40	20.5145
50	31.3064	50	30.4872
20 13 00	41.2791	20 18 00	40.4599
10	51.2517	10	50.4326
20	20 10 01.2244	20	20 15 00.4053
30	11.1971	30	10.3780
40	21.1698	40	20.3507
50	31.1425	50	30.3234
20 14 00	41.1152	20 19 00	40.2961
10	51.0879	10	50.2688
20	20 11 01.0606	20	20 16 00.2415
30	11.0333	30	10.2142
40	21.0060	40	20.1869
50	30.9787	50	30.1596

Solar.	Sidereal.	Solar.	Sidereal.
20 20 00	20 23 20.4149	20 25 00	20 28 21.2363
10	30.4423	10	31.2637
20	40.4697	20	41.2911
30	50.4971	30	51.3185
40	20 24 00.5245	40	20 29 01.3458
50	10.5518	50	11.3732
20 21 00	20.5792	20 26 00	21.4006
10	30.6066	10	31.4280
20	40.6340	20	41.4554
30	50.6614	30	51.4827
40	20 25 00.6887	40	20 30 01.5101
50	10.7161	50	11.5375
20 22 00	20.7435	20 27 00	21.5649
10	30.7709	10	31.5922
20	40.7983	20	41.6196
30	50.8256	30	51.6470
40	20 26 00.8530	40	20 31 01.6744
50	10.8804	50	11.7018
20 23 00	20.9078	20 28 00	21.7291
10	30.9352	10	31.7565
20	40.9625	20	41.7839
30	50.9899	30	51.8113
40	20 27 01.0173	40	20 32 01.8387
50	11.0447	50	11.8660
20 24 00	21.0720	20 29 00	21.8934
10	31.0994	10	31.9208
20	41.1268	20	41.9482
30	51.1542	30	51.9756
40	20 28 01.1816	40	20 33 02.0029
50	11.2089	50	12.0303

Sidereal.	Solar.	Sidereal.	Solar.
20 20 00	20 16 40.1323	20 25 00	20 21 39.3131
10	50.1050	10	49.2858
20	20 17 00.0777	20	59.2585
30	10.0504	30	20 22 09.2312
40	20.0231	40	19.2039
50	29.9957	50	29.1766
20 21 00	39.9684	20 26 00	39.1493
10	49.9411	10	49.1220
20	59.9138	20	59.0947
30	20 18 09.8865	30	20 23 09.0674
40	19.8592	40	19.0401
50	29.8319	50	29.0128
20 22 00	39.8046	20 27 00	38.9855
10	49.7773	10	48.9582
20	59.7500	20	58.9309
30	20 19 09.7227	30	20 24 08.9036
40	19.6954	40	18.8763
50	29.6681	50	28.8490
20 23 00	39.6408	20 28 00	38.8217
10	49.6135	10	48.7944
20	59.5862	20	58.7671
30	20 20 09.5589	30	20 25 08.7398
40	19.5316	40	18.7124
50	29.5043	50	28.6851
20 24 00	39.4770	20 29 00	38.6578
10	49.4497	10	48.6305
20	59.4224	20	58.6032
30	20 21 09.3951	30	20 26 08.5759
40	19.3678	40	18.5486
50	29.3404	50	28.5213

Solar.	Sidereal.	Solar.	Sidereal.
20 30 00	20 33 22.0577	20 35 00	20 38 22.8791
10	32.0851	10	32.9064
20	42.1125	20	42.9338
30	52.1398	30	52.9612
40	20 34 02.1672	40	20 39 02.9886
50	12.1946	50	13.0160
20 31 00	22.2220	20 36 00	23.0433
10	32.2493	10	33.0707
20	42.2767	20	43.0981
30	52.3041	30	53.1255
40	20 35 02.3315	40	20 40 03.1529
50	12.3589	50	13.1802
20 32 00	22.3862	20 37 00	23.2076
10	32.4136	10	33.2350
20	42.4410	20	43.2624
30	52.4684	30	53.2898
40	20 36 02.4958	40	20 41 03.3171
50	12.5231	50	13.3445
20 33 00	22.5505	20 38 00	23.3719
10	32.5779	10	33.3993
20	42.6053	20	43.4266
30	52.6327	30	53.4540
40	20 37 02.6600	40	20 42 03.4814
50	12.6874	50	13.5088
20 34 00	22.7148	20 39 00	23.5362
10	32.7422	10	33.5635
20	42.7696	20	43.5909
30	52.7969	30	53.6183
40	20 38 02.8243	40	20 43 03.6457
50	12.8517	50	13.6731

Sidereal.	Solar.	Sidereal.	Solar.
20 30 00	20 26 38.4940	20 35 00	20 31 37.6749
10	48.4667	10	47.6476
20	58.4394	20	57.6203
30	20 27 08.4121	30	20 32 07.5930
40	18.3848	40	17.5657
50	28.3575	50	27.5384
20 31 00	38.3302	20 36 00	37.5111
10	48.3029	10	47.4838
20	58.2756	20	57.4564
30	20 28 08.2483	30	20 33 07.4291
40	18.2210	40	17.4018
50	28.1937	50	27.3745
20 32 00	38.1664	20 37 00	37.3472
10	48.1391	10	47.3199
20	58.1118	20	57.2926
30	20 29 08.0844	30	20 34 07.2653
40	18.0571	40	17.2380
50	28.0298	50	27.2107
20 33 00	38.0025	20 38 00	37.1834
10	47.9752	10	47.1561
20	57.9479	20	57.1288
30	20 30 07.9206	30	20 35 07.1015
40	17.8933	40	17.0742
50	27.8660	50	27.0469
20 34 00	37.8387	20 39 00	37.0196
10	47.8114	10	46.9923
20	57.7841	20	56.9650
30	20 31 07.7568	30	20 36 06.9377
40	17.7295	40	16.9104
50	27.7022	50	26.8831

Solar.	Sidereal.	Solar.	Sidereal.
20 40 00	20 43 23.7004	20 45 00	20 48 24.5218
10	33.7278	10	34.5492
20	43.7552	20	44.5766
30	53.7826	30	54.6039
40	20 44 03.8100	40	20 49 04.6313
50	13.8373	50	14.6587
20 41 00	23.8647	20 46 00	24.6861
10	33.8921	10	34.7135
20	43.9195	20	44.7408
30	53.9469	30	54.7682
40	20 45 03.9742	40	20 50 04.7956
50	14.0016	50	14.8230
20 42 00	24.0290	20 47 00	24.8504
10	34.0564	10	34.8777
20	44.0837	20	44.9051
30	54.1111	30	54.9325
40	20 46 04.1385	40	20 51 04.9599
50	14.1659	50	14.9873
20 43 00	24.1933	20 48 00	25.0146
10	34.2206	10	35.0420
20	44.2480	20	45.0694
30	54.2754	30	55.0968
40	20 47 04.3028	40	20 52 05.1242
50	14.3302	50	15.1515
20 44 00	24.3575	20 49 00	25.1789
10	34.3849	10	35.2063
20	44.4123	20	45.2337
30	54.4397	30	55.2610
40	20 48 04.4671	40	20 53 05.2884
50	14.4944	50	15.3158

Sidereal.	Solar.	Sidereal.	Solar.
20 40 00	20 36 36.8558	20 45 00	20 41 36.0366
10	46.8284	10	46.0093
20	56.8011	20	55.9820
30	20 37 06.7738	30	20 42 05.9547
40	16.7465	40	15.9274
50	26.7192	50	25.9001
20 41 00	36.6919	20 46 00	35.8728
10	46.6646	10	45.8455
20	56.6373	20	55.8182
30	20 38 06.6100	30	20 43 05.7909
40	16.5827	40	15.7636
50	26.5554	50	25.7363
20 42 00	36.5281	20 47 00	35.7090
10	46.5008	10	45.6817
20	56.4735	20	55.6544
30	20 39 06.4462	30	20 44 05.6271
40	16.4189	40	15.5998
50	26.3916	50	25.5724
20 43 00	36.3643	20 48 00	35.5451
10	46.3370	10	45.5178
20	56.3097	20	55.4905
30	20 40 06.2824	30	20 45 05.4632
40	16.2551	40	15.4359
50	26.2278	50	25.4086
20 44 00	36.2004	20 49 00	35.3813
10	46.1731	10	45.3540
20	56.1458	20	55.3267
30	20 41 06.1185	30	20 46 05.2994
40	16.0912	40	15.2721
50	26.0639	50	25.2448

Solar.	Sidereal.	Solar.	Sidereal.
20 50 00	20 53 25.3432	20 55 00	20 58 26.1646
10	35.3706	10	36.1919
20	45.3979	20	46.2193
30	55.4253	30	56.2467
40	20 54 05.4527	40	20 59 06.2741
50	15.4801	50	16.3015
20 51 00	25.5075	20 56 00	26.3288
10	35.5348	10	36.3562
20	45.5622	20	46.3836
30	55.5896	30	56.4110
40	20 55 05.6170	40	21 00 06.4383
50	15.6444	50	16.4657
20 52 00	25.6717	20 57 00	26.4931
10	35.6991	10	36.5205
20	45.7265	20	46.5479
30	55.7539	30	56.5752
40	20 56 05.7813	40	21 01 06.6026
50	15.8086	50	16.6300
20 53 00	25.8360	20 58 00	26.6574
10	35.8634	10	36.6848
20	45.8908	20	46.7121
30	55.9181	30	56.7395
40	20 57 05.9455	40	21 02 06.7669
50	15.9729	50	16.7943
20 54 00	26.0003	20 59 00	26.8217
10	36.0277	10	36.8490
20	46.0550	20	46.8764
30	56.0824	30	56.9038
40	20 58 06.1098	40	21 03 06.9312
50	16.1372	50	16.9586



Sidereal.	Solar.	Sidereal.	Solar.
20 50 00	20 46 35.2175	20 55 00	20 51 34.3984
10	45.1902	10	44.3711
20	55.1629	20	54.3438
30	20 47 05.1356	30	20 52 04.3164
40	15.1083	40	14.2891
50	25.0810	50	24.2618
20 51 00	35.0537	20 56 00	34.2345
10	45.0264	10	44.2072
20	54.9991	20	54.1799
30	20 48 04.9718	30	20 53 04.1526
40	14.9444	40	14.1253
50	24.9171	50	24.0980
20 52 00	34.8898	20 57 00	34.0707
10	44.8625	10	44.0434
20	54.8352	20	54.0161
30	20 49 04.8079	30	20 54 03.9888
40	14.7806	40	13.9615
50	24.7533	50	23.9342
20 53 00	34.7260	20 58 00	33.9069
10	44.6987	10	43.8796
20	54.6714	20	53.8523
30	20 50 04.6441	30	20 55 03.8250
40	14.6168	40	13.7977
50	24.5895	50	23.7704
20 54 00	34.5622	20 59 00	33.7431
10	44.5349	10	43.7158
20	54.5076	20	53.6884
30	20 51 04.4803	30	20 56 03.6611
40	14.4530	40	13.6338
50	24.4257	50	23.6065

Solar.	Sidereal.	Solar.	Sidereal.
21 00 00	21 03 26.9859	21 05 00	21 08 27.8073
10	37.0133	10	37.8347
20	47.0407	20	47.8621
30	57.0681	30	57.8894
40	21 04 07.0954	40	21 09 07.9168
50	17.1228	50	17.9442
21 01 00	27.1502	21 06 00	27.9716
10	37.1776	10	37.9990
20	47.2050	20	48.0263
30	57.2323	30	58.0537
40	21 05 07.2597	40	21 10 08.0811
50	17.2871	50	18.1085
21 02 00	27.3145	21 07 00	28.1359
10	37.3419	10	38.1632
20	47.3692	20	48.1906
30	57.3966	30	58.2180
40	21 06 07.4240	40	21 11 08.2454
50	17.4514	50	18.2727
21 03 00	27.4788	21 08 00	28.3001
10	37.5061	10	38.3275
20	47.5335	20	48.3549
30	57.5609	30	58.3823
40	21 07 07.5883	40	21 12 08.4096
50	17.6156	50	18.4370
21 04 00	27.6430	21 09 00	28.4644
10	37.6704	10	38.4918
20	47.6978	20	48.5192
30	57.7252	30	58.5465
40	21 08 07.7525	40	21 13 08.5739
50	17.7799	50	18.6013

Sidereal.	Solar.	Sidereal.	Solar.
21 00 00	20 56 33.5792	21 05 00	21 01 32.7601
10	43.5519	10	42.7328
20	53.5246	20	52.7055
30	20 57 03.4973	30	21 02 02.6782
40	13.4700	40	12.6509
50	23.4427	50	22.6236
21 01 00	33.4154	21 06 00	32.5963
10	43.3881	10	42.5690
20	53.3608	20	52.5417
30	20 58 03.3335	30	21 03 02.5144
40	13.3062	40	12.4871
50	23.2789	50	22.4598
21 02 00	33.2516	21 07 00	32.4324
10	43.2243	10	42.4051
20	53.1970	20	52.3778
30	20 59 03.1697	30	21 04 02.3505
40	13.1424	40	12.3232
50	23.1151	50	22.2959
21 03 00	33.0878	21 08 00	32.2686
10	43.0604	10	42.2413
20	53.0331	20	52.2140
30	21 00 03.0058	30	21 05 02.1867
40	12.9785	40	12.1594
50	22.9512	50	22.1321
21 04 00	32.9239	21 09 00	32.1048
10	42.8966	10	42.0775
20	52.8693	20	52.0502
30	21 01 02.8420	30	21 06 02.0229
40	12.8147	40	11.9956
50	22.7874	50	21.9683

Solar.	Sidereal.	Solar.	Sidereal.
21 10 00	21 13 28.6287	21 15 00	21 18 29.4500
10	38.6561	10	39.4774
20	48.6834	20	49.5048
30	58.7108	30	59.5322
40	21 14 08.7382	40	21 19 09.5596
50	18.7656	50	19.5869
21 11 00	28.7930	21 16 00	29.6143
10	38.8203	10	39.6417
20	48.8477	20	49.6691
30	58.8751	30	59.6965
40	21 15 08.9025	40	21 20 09.7238
50	18.9298	50	19.7512
21 12 00	28.9572	21 17 00	29.7786
10	38.9846	10	39.8060
20	49.0120	20	49.8334
30	59.0394	30	59.8607
40	21 16 09.0667	40	21 21 09.8881
50	19.0941	50	19.9155
21 13 00	29.1215	21 18 00	29.9429
10	39.1489	10	39.9703
20	49.1763	20	49.9976
30	59.2036	30	21 22 00.0250
40	21 17 09.2310	40	10.0524
50	19.2584	50	20.0798
21 14 00	29.2858	21 19 00	30.1071
10	39.3132	10	40.1345
20	49.3405	20	50.1619
30	59.3679	30	21 23 00.1893
40	21 18 09.3953	40	10.2167
50	19.4227	50	20.2440

Sidereal.	Solar.	Sidereal.	Solar.
21 10 00	21 06 31.9410	21 15 00	21 11 31.1218
10	41.9137	10	41.0945
20	51.8864	20	51.0672
30	21 07 01.8591	30	21 12 01.0399
40	11.8318	40	11.0126
50	21.8044	50	20.9853
21 11 00	31.7771	21 16 00	30.9580
10	41.7498	10	40.9307
20	51.7225	20	50.9034
30	21 08 01.6952	30	21 13 00.8761
40	11.6679	40	10.8488
50	21.6406	50	20.8215
21 12 00	31.6133	21 17 00	30.7942
10	41.5860	10	40.7669
20	51.5587	20	50.7396
30	21 09 01.5314	30	21 14 00.7123
40	11.5041	40	10.6850
50	21.4768	50	20.6577
21 13 00	31.4495	21 18 00	30.6304
10	41.4222	10	40.6031
20	51.3949	20	50.5758
30	21 10 01.3676	30	21 15 00.5485
40	11.3403	40	10.5211
50	21.3130	50	20.4938
21 14 00	31.2857	21 19 00	30.4665
10	41.2584	10	40.4392
20	51.2311	20	50.4119
30	21 11 01.2038	30	21 16 00.3846
40	11.1764	40	10.3573
50	21.1491	50	20.3300

Solar.	Sidereal.	Solar.	Sidereal.
21 20 00	21 23 30.2714	21 25 00	21 28 31.0928
10	40.2988	10	41.1202
20	50.3262	20	51.1476
30	21 24 00.3536	30	21 29 01.1749
40	10.3809	40	11.2023
50	20.4083	50	21.2297
21 21 00	30.4357	21 26 00	31.2571
10	40.4631	10	41.2844
20	50.4905	20	51.3118
30	21 25 00.5178	30	21 30 01.3392
40	10.5452	40	11.3666
50	20.5726	50	21.3940
21 22 00	30.6000	21 27 00	31.4213
10	40.6273	10	41.4487
20	50.6547	20	51.4761
30	21 26 00.6821	30	21 31 01.5035
40	10.7095	40	11.5309
50	20.7369	50	21.5582
21 23 00	30.7642	21 28 00	31.5856
10	40.7916	10	41.6130
20	50.8190	20	51.6404
30	21 27 00.8464	30	21 32 01.6678
40	10.8738	40	11.6951
50	20.9011	50	21.7225
21 24 00	30.9285	21 29 00	31.7499
10	40.9559	10	41.7773
20	50.9833	20	51.8047
30	21 28 01.0107	30	21 33 01.8320
40	11.0380	40	11.8594
50	21.0654	50	21.8868

Sidereal.	Solar.	Sidereal.	Solar.
21 20 00	21 16 30.3027	21 25 00	21 21 29.4836
10	40.2754	10	39.4563
20	50.2481	20	49.4290
30	21 17 00.2208	30	59.4017
40	10.1935	40	21 22 09.3744
50	20.1662	50	19.3471
21 21 00	30.1389	21 26 00	29.3198
10	40.1116	10	39.2925
20	50.0843	20	49.2651
30	21 18 00.0570	30	59.2378
40	10.0297	40	21 23 09.2105
50	20.0024	50	19.1832
21 22 00	29.9751	21 27 00	29.1559
10	39.9478	10	39.1286
20	49.9205	20	49.1013
30	59.8931	30	59.0740
40	21 19 09.8658	40	21 24 09.0467
50	19.8385	50	19.0194
21 23 00	29.8112	21 28 00	28.9921
10	39.7839	10	38.9648
20	49.7566	20	48.9375
30	59.7293	30	58.9102
40	21 20 09.7020	40	21 25 08.8829
50	19.6747	50	18.8556
21 24 00	29.6474	21 29 00	28.8283
10	39.6201	10	38.8010
20	49.5928	20	48.7737
30	59.5655	30	58.7464
40	21 21 09.5382	40	21 26 08.7191
50	19.5109	50	18.6918

Solar.	Sidereal.	Solar.	Sidereal.
21 30 00	21 33 31.9142	21 35 00	21 38 32.7355
10	41.9415	10	42.7629
20	51.9689	20	52.7903
30	21 34 01.9963	30	21 39 02.8177
40	12.0237	40	12.8451
50	22.0511	50	22.8724
21 31 00	32.0784	21 36 00	32.8998
10	42.1058	10	42.9272
20	52.1332	20	52.9546
30	21 35 02.1606	30	21 40 02.9820
40	12.1880	40	13.0093
50	22.2153	50	23.0367
21 32 00	32.2427	21 37 00	33.0641
10	42.2701	10	43.0915
20	52.2975	20	53.1188
30	21 36 02.3249	30	21 41 03.1462
40	12.3522	40	13.1736
50	22.3796	50	23.2010
21 33 00	32.4070	21 38 00	33.2284
10	42.4344	10	43.2557
20	52.4617	20	53.2831
30	21 37 02.4891	30	21 42 03.3105
40	12.5165	40	13.3379
50	22.5439	50	23.3653
21 34 00	32.5713	21 39 00	33.3926
10	42.5986	10	43.4200
20	52.6260	20	53.4474
30	21 38 02.6534	30	21 43 03.4748
40	12.6808	40	13.5022
50	22.7082	50	23.5295



Sidereal.	Solar.	Sidereal.	Solar.
21 30 00	21 26 28.6645	21 35 00	21 31 27.8453
10	38.6371	10	37.8180
20	48.6098	20	47.7907
30	58.5825	30	57.7634
40	21 27 08.5552	40	21 32 07.7361
50	18.5279	50	17.7088
21 31 00	28.5006	21 36 00	27.6815
10	38.4733	10	37.6542
20	48.4460	20	47.6269
30	58.4187	30	57.5996
40	21 28 08.3914	40	21 33 07.5723
50	18.3641	50	17.5450
21 32 00	28.3368	21 37 00	27.5177
10	38.3095	10	37.4904
20	48.2822	20	47.4631
30	58.2549	30	57.4358
40	21 29 08.2276	40	21 34 07.4085
50	18.2003	50	17.3811
21 33 00	28.1730	21 38 00	27.3538
10	38.1457	10	37.3265
20	48.1184	20	47.2992
30	58.0911	30	57.2719
40	21 30 08.0638	40	21 35 07.2446
50	18.0365	50	17.2173
21 34 00	28.0091	21 39 00	27.1900
10	37.9818	10	37.1627
20	47.9545	20	47.1354
30	57.9272	30	57.1081
40	21 31 07.8999	40	21 36 07.0808
50	17.8726	50	17.0535

Solar.	Sidereal.	Solar.	Sidereal.
21 40 00	21 43 33.5569	21 45 00	21 48 34.3783
10	43.5843	10	44.4057
20	53.6117	20	54.4330
30	21 44 03.6390	30	21 49 04.4604
40	13.6664	40	14.4878
50	23.6938	50	24.5152
21 41 00	33.7212	21 46 00	34.5426
10	43.7486	10	44.5699
20	53.7759	20	54.5973
30	21 45 03.8033	30	21 50 04.6247
40	13.8307	40	14.6521
50	23.8581	50	24.6795
21 42 00	33.8855	21 47 00	34.7068
10	43.9128	10	44.7342
20	53.9402	20	54.7616
30	21 46 03.9676	30	21 51 04.7890
40	13.9950	40	14.8164
50	24.0224	50	24.8437
21 43 00	34.0497	21 48 00	34.8711
10	44.0771	10	44.8985
20	54.1045	20	54.9259
30	21 47 04.1319	30	21 52 04.9532
40	14.1593	40	14.9806
50	24.1866	50	25.0080
21 44 00	34.2140	21 49 00	35.0354
10	44.2414	10	45.0628
20	54.2688	20	55.0901
30	21 48 04.2961	30	21 53 05.1175
40	14.3235	40	15.1449
50	24.3509	50	25.1723

Sidereal.	Solar.	Sidereal.	Solar.
21 40 00	21 36 27.0262	21 45 00	21 41 26.2071
10	36.9989	10	36.1798
20	46.9716	20	46.1525
30	56.9443	30	56.1251
40	21 37 06.9170	40	21 42 06.0978
50	16.8897	50	16.0705
21 41 00	26.8624	21 46 00	26.0432
10	36.8351	10	36.0159
20	46.8078	20	45.9886
30	56.7805	30	55.9613
40	21 38 06.7531	40	21 43 05.9340
50	16.7258	50	15.9067
21 42 00	26.6985	21 47 00	25.8794
10	36.6712	10	35.8521
20	46.6439	20	45.8248
30	56.6166	30	55.7975
40	21 39 06.5893	40	21 44 05.7702
50	16.5620	50	15.7429
21 43 00	26.5347	21 48 00	25.7156
10	36.5074	10	35.6883
20	46.4801	20	45.6610
30	56.4528	30	55.6337
40	21 40 06.4255	40	21 45 05.6064
50	16.3982	50	15.5791
21 44 00	26.3709	21 49 00	25.5518
10	36.3436	10	35.5245
20	46.3163	20	45.4971
30	56.2890	30	55.4698
40	21 41 06.2617	40	21 46 05.4425
50	16.2344	50	15.4152

Solar.	Sidereal.	Solar.	Sidereal.
21 50 00	21 53 35.1997	21 55 00	21 58 36.0210
10	45.2270	10	46.0484
20	55.2544	20	56.0758
30	21 54 05.2818	30	21 59 06.1032
40	15.3092	40	16.1305
50	25.3366	50	26.1579
21 51 00	35.3639	21 56 00	36.1853
10	45.3913	10	46.2127
20	55.4187	20	56.2401
30	21 55 05.4461	30	22 00 06.2674
40	15.4734	40	16.2948
50	25.5008	50	26.3222
21 52 00	35.5282	21 57 00	36.3496
10	45.5556	10	46.3770
20	55.5830	20	56.4043
30	21 56 05.6103	30	22 01 06.4317
40	15.6377	40	16.4591
50	25.6651	50	26.4865
21 53 00	35.6925	21 58 00	36.5139
10	45.7199	10	46.5412
20	55.7472	20	56.5686
30	21 57 05.7746	30	22 02 06.5960
40	15.8020	40	16.6234
50	25.8294	50	26.6507
21 54 00	35.8568	21 59 00	36.6781
10	45.8841	10	46.7055
20	55.9115	20	56.7329
30	21 58 05.9389	30	22 03 06.7603
40	15.9663	40	16.7876
50	25.9937	50	26.8150

Sidereal.	Solar.	Sidereal.	Solar.
21 50 00	21 46 25.3879	21 55 00	21 51 24.5688
10	35.3606	10	34.5415
20	45.3333	20	44.5142
30	55.3060	30	54.4869
40	21 47 05.2787	40	21 52 04.4596
50	15.2514	50	14.4323
21 51 00	25.2241	21 56 00	24.4050
10	35.1968	10	34.3777
20	45.1695	20	44.3504
30	55.1422	30	54.3231
40	21 48 05.1149	40	21 53 04.2958
50	15.0876	50	14.2685
21 52 00	25.0603	21 57 00	24.2411
10	35.0330	10	34.2138
20	45.0057	20	44.1865
30	54.9784	30	54.1592
40	21 49 04.9511	40	21 54 04.1319
50	14.9238	50	14.1046
21 53 00	24.8965	21 58 00	24.0773
10	34.8691	10	34.0500
20	44.8418	20	44.0227
30	54.8145	30	53.9954
40	21 50 04.7872	40	21 55 03.9681
50	14.7599	50	13.9408
21 54 00	24.7326	21 59 00	23.9135
10	34.7053	10	33.8862
20	44.6780	20	43.8589
30	54.6507	30	53.8316
40	21 51 04.6234	40	21 56 03.8043
50	14.5961	50	13.7770

Solar.	Sidereal.	Solar.	Sidereal.
22 00 00	22 03 36.8424	22 05 00	22 08 37.6638
10	46.8698	10	47.6912
20	56.8972	20	57.7185
30	22 04 06.9245	30	22 09 07.7459
40	16.9519	40	17.7733
50	26.9793	50	27.8007
22 01 00	37.0067	22 06 00	37.8281
10	47.0341	10	47.8554
20	57.0614	20	57.8828
30	22 05 07.0888	30	22 10 07.9102
40	17.1162	40	17.9376
50	27.1436	50	27.9649
22 02 00	37.1710	22 07 00	37.9923
10	47.1983	10	48.0197
20	57.2257	20	58.0471
30	22 06 07.2531	30	22 11 08.0745
40	17.2805	40	18.1018
50	27.3078	50	28.1292
22 03 00	37.3352	22 08 00	38.1566
10	47.3626	10	48.1840
20	57.3900	20	58.2114
30	22 07 07.4174	30	22 12 08.2387
40	17.4447	40	18.2661
50	27.4721	50	28.2935
22 04 00	37.4995	22 09 00	38.3209
10	47.5269	10	48.3483
20	57.5543	20	58.3756
30	22 08 07.5816	30	22 13 08.4030
40	17.6090	40	18.4304
50	27.6364	50	28.4578

Sidereal.	Solar.	Sidereal.	Solar.
22 00 00	21 56 23.7497	22 05 00	22 01 22.9305
10	33.7224	10	32.9032
20	43.6951	20	42.8759
30	53.6678	30	52.8486
40	21 57 03.6405	40	22 02 02.8213
50	13.6131	50	12.7940
22 01 00	23.5858	22 06 00	22.7667
10	33.5585	10	32.7394
20	43.5312	20	42.7121
30	53.5039	30	52.6848
40	21 58 03.4766	40	22 03 02.6575
50	13.4493	50	12.6302
22 02 00	23.4220	22 07 00	22.6029
10	33.3947	10	32.5756
20	43.3674	20	42.5483
30	53.3401	30	52.5210
40	21 59 03.3128	40	22 04 02.4937
50	13.2855	50	12.4664
22 03 00	23.2582	22 08 00	22.4391
10	33.2309	10	32.4118
20	43.2036	20	42.3845
30	53.1763	30	52.3571
40	22 00 03.1490	40	22 05 02.3298
50	13.1217	50	12.3025
22 04 00	23.0944	22 09 00	22.2752
10	33.0671	10	32.2479
20	43.0398	20	42.2206
30	53.0125	30	52.1933
40	22 01 02.9851	40	22 06 02.1660
50	12.9578	50	12.1387

Solar.	Sidereal.	Solar.	Sidereal.
22 10 00	22 13 38.4851	22 15 00	22 18 39.3065
10	48.5125	10	49.3339
20	58.5399	20	59.3613
30	22 14 08.5673	30	22 19 09.3887
40	18.5947	40	19.4160
50	28.6220	50	29.4434
22 11 00	38.6494	22 16 00	39.4708
10	48.6768	10	49.4982
20	58.7042	20	59.5256
30	22 15 08.7316	30	22 20 09.5529
40	18.7589	40	19.5803
50	28.7863	50	29.6077
22 12 00	38.8137	22 17 00	39.6351
10	48.8411	10	49.6624
20	58.8685	20	59.6898
30	22 16 08.8958	30	22 21 09.7172
40	18.9232	40	19.7446
50	28.9506	50	29.7720
22 13 00	38.9780	22 18 00	39.7993
10	49.0054	10	49.8267
20	59.0327	20	59.8541
30	22 17 09.0601	30	22 22 09.8815
40	19.0875	40	19.9089
50	29.1149	50	29.9362
22 14 00	39.1422	22 19 00	39.9636
10	49.1696	10	49.9910
20	59.1970	20	22 23 00.0184
30	22 18 09.2244	30	10.0458
40	19.2518	40	20.0731
50	29.2791	50	30.1005



Sidereal.	Solar.	Sidereal.	Solar.
22 10 00	22 06 22.1114	22 15 00	22 11 21.2923
10	32.0841	10	31.2650
20	42.0568	20	41.2377
30	52.0295	30	51.2104
40	22 07 02.0022	40	22 12 01.1831
50	11.9749	50	11.1558
22 11 00	21.9476	22 16 00	21.1285
10	31.9203	10	31.1012
20	41.8930	20	41.0738
30	51.8657	30	51.0465
40	22 08 01.8384	40	22 13 01.0192
50	11.8111	50	10.9919
22 12 00	21.7838	22 17 00	20.9646
10	31.7565	10	30.9373
20	41.7292	20	40.9100
30	51.7018	30	50.8827
40	22 09 01.6745	40	22 14 00.8554
50	11.6472	50	10.8281
22 13 00	21.6199	22 18 00	20.8008
10	31.5926	10	30.7735
20	41.5653	20	40.7462
30	51.5380	30	50.7189
40	22 10 01.5107	40	22 15 00.6916
50	11.4834	50	10.6643
22 14 00	21.4561	22 19 00	20.6370
10	31.4288	10	30.6097
20	41.4015	20	40.5824
30	51.3742	30	50.5551
40	22 11 01.3469	40	22 16 00.5278
50	11.3196	50	10.5005

Solar.	Sidereal.	Solar.	Sidereal.
22 20 00	22 23 40.1279	22 25 00	22 28 40.9493
10	50.1553	10	50.9766
20	22 24 00.1827	20	22 29 01.0040
30	10.2100	30	11.0314
40	20.2374	40	21.0588
50	30.2648	50	31.0862
22 21 00	40.2922	22 26 00	41.1135
10	50.3195	10	51.1409
20	22 25 00.3469	20	22 30 01.1683
30	10.3743	30	11.1957
40	20.4017	40	21.2231
50	30.4291	50	31.2504
22 22 00	40.4564	22 27 00	41.2778
10	50.4838	10	51.3052
20	22 26 00.5112	20	22 31 01.3326
30	10.5386	30	11.3600
40	20.5660	40	21.3873
50	30.5933	50	31.4147
22 23 00	40.6207	22 28 00	41.4421
10	50.6481	10	51.4695
20	22 27 00.6755	20	22 32 01.4968
30	10.7029	30	11.5242
40	20.7302	40	21.5516
50	30.7576	50	31.5790
22 24 00	40.7850	22 29 00	41.6064
10	50.8124	10	51.6337
20	22 28 00.8398	20	22 33 01.6611
30	10.8671	30	11.6885
40	20.8945	40	21.7159
50	30.9219	50	31.7433

Sidereal.	Solar.	Sidereal.	Solar.
22 20 00	22 16 20.4732	22 25 00	22 21 19.6540
10	30.4458	10	29.6267
20	40.4185	20	39.5994
30	50.3912	30	49.5721
40	22 17 00.3639	40	59.5448
50	10.3366	50	22 22 09.5175
22 21 00	20.3093	22 26 00	19.4902
10	30.2820	10	29.4629
20	40.2547	20	39.4356
30	50.2274	30	49.4083
40	22 18 00.2001	40	59.3810
50	10.1728	50	22 23 09.3537
22 22 00	20.1455	22 27 00	19.3264
10	30.1182	10	29.2991
20	40.0909	20	39.2718
30	50.0636	30	49.2445
40	22 19 00.0363	40	59.2172
50	10.0090	50	22 24 09.1898
22 23 00	19.9817	22 28 00	19.1625
10	29.9544	10	29.1352
20	39.9271	20	39.1079
30	49.8998	30	49.0806
40	59.8725	40	59.0533
50	22 20 09.8452	50	22 25 09.0260
22 24 00	19.8178	22 29 00	18.9987
10	29.7905	10	28.9714
20	39.7632	20	38.9441
30	49.7359	30	48.9168
40	59.7086	40	58.8895
50	22 21 09.6813	50	22 26 08.8622

Solar.	Sidereal.	Solar.	Sidereal.
22 30 00	22 33 41.7706	22 35 00	22 38 42.5920
10	51.7980	10	52.6194
20	22 34 01.8254	20	22 39 02.6468
30	11.8528	30	12.6741
40	21.8802	40	22.7015
50	31.9075	50	32.7289
22 31 00	41.9349	22 36 00	42.7563
10	51.9623	10	52.7837
20	22 35 01.9897	20	22 40 02.8110
30	12.0171	30	12.8384
40	22.0444	40	22.8658
50	32.0718	50	32.8932
22 32 00	42.0992	22 37 00	42.9206
10	52.1266	10	52.9479
20	22 36 02.1539	20	22 41 02.9753
30	12.1813	30	13.0027
40	22.2087	40	23.0301
50	32.2361	50	33.0575
22 33 00	42.2635	22 38 00	43.0848
10	52.2908	10	53.1122
20	22 37 02.3182	20	22 42 03.1396
30	12.3456	30	13.1670
40	22.3730	40	23.1944
50	32.4004	50	33.2217
22 34 00	42.4277	22 39 00	43.2491
10	52.4551	10	53.2765
20	22 38 02.4825	20	22 43 03.3039
30	12.5099	30	13.3312
40	22.5373	40	23.3586
50	32.5646	50	33.3860

Sidereal.	Solar.	Sidereal.	Solar.
22 30 00	22 26 18.8349	22 35 00	22 31 18.0158
10	28.8076	10	27.9885
20	38.7803	20	37.9612
30	48.7530	30	47.9338
40	58.7257	40	57.9065
50	22 27 08.6984	50	22 32 07.8792
22 31 00	18.6711	22 36 00	17.8519
10	28.6438	10	27.8246
20	38.6165	20	37.7973
30	48.5892	30	47.7700
40	58.5618	40	57.7427
50	22 28 08.5345	50	22 33 07.7154
22 32 00	18.5072	22 37 00	17.6881
10	28.4799	10	27.6608
20	38.4526	20	37.6335
30	48.4253	30	47.6062
40	58.3980	40	57.5789
50	22 29 08.3707	50	22 34 07.5516
22 33 00	18.3434	22 38 00	17.5243
10	28.3161	10	27.4970
20	38.2888	20	37.4697
30	48.2615	30	47.4424
40	58.2342	40	57.4151
50	22 30 08.2069	50	22 35 07.3878
22 34 00	18.1796	22 39 00	17.3605
10	28.1523	10	27.3332
20	38.1250	20	37.3058
30	48.0977	30	47.2785
40	58.0704	40	57.2512
50	22 31 08.0431	50	22 36 07.2239

Solar.	Sidereal.	Solar.	Sidereal.
22 40 00	22 43 43.4134	22 45 00	22 48 44.2348
10	53.4408	10	54.2621
20	22 44 03.4681	20	22 49 04.2895
30	13.4955	30	14.3169
40	23.5229	40	24.3443
50	33.5503	50	34.3717
22 41 00	43.5777	22 46 00	44.3990
10	53.6050	10	54.4264
20	22 45 03.6324	20	22 50 04.4538
30	13.6598	30	14.4812
40	23.6872	40	24.5085
50	33.7146	50	34.5359
22 42 00	43.7419	22 47 00	44.5633
10	53.7693	10	54.5907
20	22 46 03.7967	20	22 51 04.6181
30	13.8241	30	14.6454
40	23.8515	40	24.6728
50	33.8788	50	34.7002
22 43 00	43.9062	22 48 00	44.7276
10	53.9336	10	54.7550
20	22 47 03.9610	20	22 52 04.7823
30	13.9883	30	14.8097
40	24.0157	40	24.8371
50	34.0431	50	34.8645
22 44 00	44.0705	22 49 00	44.8919
10	54.0979	10	54.9192
20	22 48 04.1252	20	22 53 04.9466
30	14.1526	30	14.9740
40	24.1800	40	25.0014
50	34.2074	50	35.0288

Sidereal.	Solar.	Sidereal.	Solar.
22 40 00	22 36 17.1966	22 45 00	22 41 16.3775
10	27.1693	10	26.3502
20	37.1420	20	36.3229
30	47.1147	30	46.2956
40	57.0874	40	56.2683
50	22 37 07.0601	50	22 42 06.2410
22 41 00	17.0328	22 46 00	16.2137
10	27.0055	10	26.1864
20	36.9782	20	36.1591
30	46.9509	30	46.1318
40	56.9236	40	56.1045
50	22 38 06.8963	50	22 43 06.0772
22 42 00	16.8690	22 47 00	16.0498
10	26.8417	10	26.0225
20	36.8144	20	35.9952
30	46.7871	30	45.9679
40	56.7598	40	55.9406
50	22 39 06.7325	50	22 44 05.9133
22 43 00	16.7052	22 48 00	15.8860
10	26.6778	10	25.8587
20	36.6505	20	35.8314
30	46.6232	30	45.8041
40	56.5959	40	55.7768
50	22 40 06.5686	50	22 45 05.7495
22 44 00	16.5413	22 49 00	15.7222
10	26.5140	10	25.6949
20	36.4867	20	35.6676
30	46.4594	30	45.6403
40	56.4321	40	55.6130
50	22 41 06.4048	50	22 46 05.5857

Solar.	Sidereal.	Solar.	Sidereal.
22 50 00	22 53 45.0561	22 55 00	22 58 45.8775
10	55.0835	10	55.9049
20	22 54 05.1109	20	22 59 05.9323
30	15.1383	30	15.9596
40	25.1656	40	25.9870
50	35.1930	50	36.0144
22 51 00	45.2204	22 56 00	46.0418
10	55.2478	10	56.0692
20	22 55 05.2752	20	23 00 06.0965
30	15.3025	30	16.1239
40	25.3299	40	26.1513
50	35.3573	50	36.1787
22 52 00	45.3847	22 57 00	46.2061
10	55.4121	10	56.2334
20	22 56 05.4394	20	23 01 06.2608
30	15.4668	30	16.2882
40	25.4942	40	26.3156
50	35.5216	50	36.3429
22 53 00	45.5490	22 58 00	46.3703
10	55.5763	10	56.3977
20	22 57 05.6037	20	23 02 06.4251
30	15.6311	30	16.4525
40	25.6585	40	26.4798
50	35.6858	50	36.5072
22 54 00	45.7132	22 59 00	46.5346
10	55.7406	10	56.5620
20	22 58 05.7680	20	23 03 06.5894
30	15.7954	30	16.6167
40	25.8227	40	26.6441
50	35.8501	50	36.6715



Sidereal.	Solar.	Sidereal.	Solar.
22 50 00	22 46 15.5584	22 55 00	22 51 14.7392
10	25.5311	10	24.7119
20	35.5038	20	34.6846
30	45.4765	30	44.6573
40	55.4492	40	54.6300
50	22 47 05.4218	50	22 52 04.6027
22 51 00	15.3945	22 56 00	14.5754
10	25.3672	10	24.5481
20	35.3399	20	34.5208
30	45.3126	30	44.4935
40	55.2853	40	54.4662
50	22 48 05.2580	50	22 53 04.4389
22 52 00	15.2307	22 57 00	14.4116
10	25.2034	10	24.3843
20	35.1761	20	34.3570
30	45.1488	30	44.3297
40	55.1215	40	54.3024
50	22 49 05.0942	50	22 54 04.2751
22 53 00	15.0669	22 58 00	14.2478
10	25.0396	10	24.2205
20	35.0123	20	34.1932
30	44.9850	30	44.1658
40	54.9577	40	54.1385
50	22 50 04.9304	50	22 55 04.1112
22 54 00	14.9031	22 59 00	14.0839
10	24.8758	10	24.0566
20	34.8485	20	34.0293
30	44.8212	30	44.0020
40	54.7938	40	53.9747
50	22 51 04.7665	50	22 56 03.9474

Solar.	Sidereal.	Solar.	Sidereal.
23 00 00	23 03 46.6989	23 05 00	23 08 47.5202
10	56.7263	10	57.5476
20	23 04 06.7536	20	23 09 07.5750
30	16.7810	30	17.6024
40	26.8084	40	27.6298
50	36.8358	50	37.6571
23 01 00	46.8632	23 06 00	47.6845
10	56.8905	10	57.7119
20	23 05 06.9179	20	23 10 07.7393
30	16.9453	30	17.7667
40	26.9727	40	27.7940
50	37.0000	50	37.8214
23 02 00	47.0274	23 07 00	47.8488
10	57.0548	10	57.8762
20	23 06 07.0822	20	23 11 07.9036
30	17.1096	30	17.9309
40	27.1369	40	27.9583
50	37.1643	50	37.9857
23 03 00	47.1917	23 08 00	48.0131
10	57.2191	10	58.0405
20	23 07 07.2465	20	23 12 08.0678
30	17.2738	30	18.0952
40	27.3012	40	28.1226
50	37.3286	50	38.1500
23 04 00	47.3560	23 09 00	48.1773
10	57.3834	10	58.2047
20	23 08 07.4107	20	23 13 08.2321
30	17.4381	30	18.2595
40	27.4655	40	28.2869
50	37.4929	50	38.3142

Sidereal.	Solar.	Sidereal.	Solar.
23 00 00	22 56 13.9201	23 05 00	23 01 13.1010
10	23.8928	10	23.0737
20	33.8655	20	33.0464
30	43.8382	30	43.0191
40	53.8109	40	52.9918
50	22 57 03.7836	50	23 02 02.9645
23 01 00	13.7563	23 06 00	12.9372
10	23.7290	10	22.9098
20	33.7017	20	32.8825
30	43.6744	30	42.8552
40	53.6471	40	52.8279
50	22 58 03.6198	50	23 03 02.8006
23 02 00	13.5925	23 07 00	12.7733
10	23.5652	10	22.7460
20	33.5378	20	32.7187
30	43.5105	30	42.6914
40	53.4832	40	52.6641
50	22 59 03.4559	50	23 04 02.6368
23 03 00	13.4286	23 08 00	12.6095
10	23.4013	10	22.5822
20	33.3740	20	32.5549
30	43.3467	30	42.5276
40	53.3194	40	52.5003
50	23 00 03.2921	50	23 05 02.4730
23 04 00	13.2648	23 09 00	12.4457
10	23.2375	10	22.4184
20	33.2102	20	32.3911
30	43.1829	30	42.3638
40	53.1556	40	52.3365
50	23 01 03.1283	50	23 06 02.3092

Solar.	Sidereal.	Solar.	Sidereal.
23 10 00	23 13 48.3416	23 15 00	23 18 49.1630
10	58.3690	10	59.1904
20	23 14 08.3964	20	23 19 09.2178
30	18.4238	30	19.2451
40	28.4511	40	29.2725
50	38.4785	50	39.2999
23 11 00	48.5059	23 16 00	49.3273
10	58.5333	10	59.3546
20	23 15 08.5607	20	23 20 09.3820
30	18.5880	30	19.4094
40	28.6154	40	29.4368
50	38.6428	50	39.4642
23 12 00	48.6702	23 17 00	49.4915
10	58.6975	10	59.5189
20	23 16 08.7249	20	23 21 09.5463
30	18.7523	30	19.5737
40	28.7797	40	29.6011
50	38.8071	50	39.6284
23 13 00	48.8344	23 18 00	49.6558
10	58.8618	10	59.6832
20	23 17 08.8892	20	23 22 09.7106
30	18.9166	30	19.7380
40	28.9440	40	29.7653
50	38.9713	50	39.7927
23 14 00	48.9987	23 19 00	49.8201
10	59.0261	10	59.8475
20	23 18 09.0535	20	23 23 09.8749
30	19.0809	30	19.9022
40	29.1082	40	29.9296
50	39.1356	50	39.9570

Sidereal.	Solar.	Sidereal.	Solar.
23 10 00	23 06 12.2819	23 15 00	23 11 11.4627
10	22.2545	10	21.4354
20	32.2272	20	31.4081
30	42.1999	30	41.3808
40	52.1726	40	51.3535
50	23 07 02.1453	50	23 12 01.3262
23 11 00	12.1180	23 16 00	11.2989
10	22.0907	10	21.2716
20	32.0634	20	31.2443
30	42.0361	30	41.2170
40	52.0088	40	51.1897
50	23 08 01.9815	50	23 13 01.1624
23 12 00	11.9542	23 17 00	11.1351
10	21.9269	10	21.1078
20	31.8996	20	31.0805
30	41.8723	30	41.0532
40	51.8450	40	51.0259
50	23 09 01.8177	50	23 14 00.9985
23 13 00	11.7904	23 18 00	10.9712
10	21.7631	10	20.9439
20	31.7358	20	30.9166
30	41.7085	30	40.8893
40	51.6812	40	50.8620
50	23 10 01.6539	50	23 15 00.8347
23 14 00	11.6265	23 19 00	10.8074
10	21.5992	10	20.7801
20	31.5719	20	30.7528
30	41.5446	30	40.7255
40	51.5173	40	50.6982
50	23 11 01.4900	50	23 16 00.6709

Solar.	Sidereal.	Solar.	Sidereal.
23 20 00	23 23 49.9844	23 25 00	23 28 50.8057
10	23 24 00.0117	10	23 29 00.8331
20	10.0391	20	10.8605
30	20.0665	30	20.8879
40	30.0939	40	30.9153
50	40.1213	50	40.9426
23 21 00	50.1486	23 26 00	50.9700
10	23 25 00.1760	10	23 30 00.9974
20	10.2034	20	11.0248
30	20.2308	30	21.0522
40	30.2582	40	31.0795
50	40.2855	50	41.1069
23 22 00	50.3129	23 27 00	51.1343
10	23 26 00.3403	10	23 31 01.1617
20	10.3677	20	11.1890
30	20.3951	30	21.2164
40	30.4224	40	31.2438
50	40.4498	50	41.2712
23 23 00	50.4772	23 28 00	51.2986
10	23 27 00.5046	10	23 32 01.3259
20	10.5319	20	11.3533
30	20.5593	30	21.3807
40	30.5867	40	31.4081
50	40.6141	50	41.4355
23 24 00	50.6415	23 29 00	51.4628
10	23 28 00.6688	10	23 33 01.4902
20	10.6962	20	11.5176
30	20.7236	30	21.5450
40	30.7510	40	31.5724
50	40.7784	50	41.5997

Sidereal.	Solar.	Sidereal.	Solar.
23 20 00	23 16 10.6436	23 25 00	23 21 09.8245
10	20.6163	10	19.7972
20	30.5890	20	29.7699
30	40.5617	30	39.7425
40	50.5344	40	49.7152
50	23 17 00.5071	50	59.6879
23 21 00	10.4798	23 26 00	23 22 09.6606
10	20.4525	10	19.6333
20	30.4252	20	29.6060
30	40.3979	30	39.5787
40	50.3705	40	49.5514
50	23 18 00.3432	50	59.5241
23 22 00	10.3159	23 27 00	23 23 09.4968
10	20.2886	10	19.4695
20	30.2613	20	29.4422
30	40.2340	30	39.4149
40	50.2067	40	49.3876
50	23 19 00.1794	50	59.3603
23 23 00	10.1521	23 28 00	23 24 09.3330
10	20.1248	10	19.3057
20	30.0975	20	29.2784
30	40.0702	30	39.2511
40	50.0429	40	49.2238
50	23 20 00.0156	50	59.1965
23 24 00	09.9883	23 29 00	23 25 09.1692
10	19.9610	10	19.1419
20	29.9337	20	29.1145
30	39.9064	30	39.0872
40	49.8791	40	49.0599
50	59.8518	50	59.0326

Solar.	Sidereal.	Solar.	Sidereal.
23 30 00	23 33 51.6271	23 35 00	23 38 52.4485
10	23 34 01.6545	10	23 39 02.4759
20	11.6819	20	12.5032
30	21.7092	30	22.5306
40	31.7366	40	32.5580
50	41.7640	50	42.5854
23 31 00	51.7914	23 36 00	52.6128
10	23 35 01.8188	10	23 40 02.6401
20	11.8461	20	12.6675
30	21.8735	30	22.6949
40	31.9009	40	32.7223
50	41.9283	50	42.7497
23 32 00	51.9557	23 37 00	52.7770
10	23 36 01.9830	10	23 41 02.8044
20	12.0104	20	12.8318
30	22.0378	30	22.8592
40	32.0652	40	32.8866
50	42.0926	50	42.9139
23 33 00	52.1199	23 38 00	52.9413
10	23 37 02.1473	10	23 42 02.9687
20	12.1747	20	12.9961
30	22.2021	30	23.0234
40	32.2295	40	33.0508
50	42.2568	50	43.0782
23 34 00	52.2842	23 39 00	53.1056
10	23 38 02.3116	10	23 43 03.1330
20	12.3390	20	13.1603
30	22.3663	30	23.1877
40	32.3937	40	33.2151
50	42.4211	50	43.2425



Sidereal.	Solar.	Sidereal.	Solar.
23 30 00	23 26 09.0053	23 35 00	23 31 08.1862
10	18.9780	10	18.1589
20	28.9507	20	28.1316
30	38.9234	30	38.1043
40	48.8961	40	48.0770
50	58.8688	50	58.0497
23 31 00	23 27 08.8415	23 36 00	23 32 08.0224
10	18.8142	10	17.9951
20	28.7869	20	27.9678
30	38.7596	30	37.9405
40	48.7323	40	47.9132
50	58.7050	50	57.8859
23 32 00	23 28 08.6777	23 37 00	23 33 07.8585
10	18.6504	10	17.8312
20	28.6231	20	27.8039
30	38.5958	30	37.7766
40	48.5685	40	47.7493
50	58.5412	50	57.7220
23 33 00	23 29 08.5139	23 38 00	23 34 07.6947
10	18.4865	10	17.6674
20	28.4592	20	27.6401
30	38.4319	30	37.6128
40	48.4046	40	47.5855
50	58.3773	50	57.5582
23 34 00	23 30 08.3500	23 39 00	23 35 07.5309
10	18.3227	10	17.5036
20	28.2954	20	27.4763
30	38.2681	30	37.4490
40	48.2408	40	47.4217
50	58.2135	50	57.3944

Solar.	Sidereal.	Solar.	Sidereal.
23 40 00	23 43 53.2699	23 45 00	23 48 54.0912
10	23 44 03.2972	10	23 49 04.1186
20	13.3246	20	14.1460
30	23.3520	30	24.1734
40	33.3794	40	34.2007
50	43.4068	50	44.2281
23 41 00	53.4341	23 46 00	54.2555
10	23 45 03.4615	10	23 50 04.2829
20	13.4889	20	14.3103
30	23.5163	30	24.3376
40	33.5436	40	34.3650
50	43.5710	50	44.3924
23 42 00	53.5984	23 47 00	54.4198
10	23 46 03.6258	10	23 51 04.4472
20	13.6532	20	14.4745
30	23.6805	30	24.5019
40	33.7079	40	34.5293
50	43.7353	50	44.5567
23 43 00	53.7627	23 48 00	54.5841
10	23 47 03.7901	10	23 52 04.6114
20	13.8174	20	14.6388
30	23.8448	30	24.6662
40	33.8722	40	34.6936
50	43.8996	50	44.7209
23 44 00	53.9270	23 49 00	54.7483
10	23 48 03.9543	10	23 53 04.7757
20	13.9817	20	14.8031
30	24.0091	30	24.8305
40	34.0365	40	34.8578
50	44.0639	50	44.8852

Sidereal.	Solar.	Sidereal.	Solar.
23 40 00	23 36 07.3671	23 45 00	23 41 06.5479
10	17.3398	10	16.5206
20	27.3125	20	26.4933
30	37.2852	30	36.4660
40	47.2579	40	46.4387
50	57.2305	50	56.4114
23 41 00	23 37 07.2032	23 46 00	23 42 06.3841
10	17.1759	10	16.3568
20	27.1486	20	26.3295
30	37.1213	30	36.3022
40	47.0940	40	46.2749
50	57.0667	50	56.2476
23 42 00	23 38 07.0394	23 47 00	23 43 06.2203
10	17.0121	10	16.1930
20	26.9848	20	26.1657
30	36.9575	30	36.1384
40	46.9302	40	46.1111
50	56.9029	50	56.0838
23 43 00	23 39 06.8756	23 48 00	23 44 06.0565
10	16.8483	10	16.0292
20	26.8210	20	26.0019
30	36.7937	30	35.9745
40	46.7664	40	45.9472
50	56.7391	50	55.9199
23 44 00	23 40 06.7118	23 49 00	23 45 05.8926
10	16.6845	10	15.8653
20	26.6572	20	25.8380
30	36.6299	30	35.8107
40	46.6025	40	45.7834
50	56.5752	50	55.7561

Solar.	Sidereal.	Solar.	Sidereal.
23 50 00	23 53 54.9126	23 55 00	23 58 55.7340
10	23 54 04.9400	10	23 59 05.7614
20	14.9674	20	15.7887
30	24.9947	30	25.8161
40	35.0221	40	35.8435
50	45.0495	50	45.8709
23 51 00	55.0769	23 56 00	55.8983
10	23 55 05.1043	10	24 00 05.9256
20	15.1316	20	15.9530
30	25.1590	30	25.9804
40	35.1864	40	36.0078
50	45.2138	50	46.0351
23 52 00	55.2412	23 57 00	56.0625
10	23 56 05.2685	10	24 01 06.0899
20	15.2959	20	16.1173
30	25.3233	30	26.1447
40	35.3507	40	36.1720
50	45.3780	50	46.1994
23 53 00	55.4054	23 58 00	56.2268
10	23 57 05.4328	10	24 02 06.2542
20	15.4602	20	16.2816
30	25.4876	30	26.3089
40	35.5149	40	36.3363
50	45.5423	50	46.3637
23 54 00	55.5697	23 59 00	56.3911
10	23 58 05.5971	10	24 03 06.4185
20	15.6245	20	16.4458
30	25.6518	30	26.4732
40	35.6792	40	36.5006
50	45.7066	50	46.5280

Sidereal.	Solar.	Sidereal.	Solar.
23 50 00	23 46 05.7288	23 55 00	23 51 04.9097
10	15.7015	10	14.8824
20	25.6742	20	24.8551
30	35.6469	30	34.8278
40	45.6196	40	44.8005
50	55.5923	50	54.7732
23 51 00	23 47 05.5650	23 56 00	23 52 04.7459
10	15.5377	10	14.7185
20	25.5104	20	24.6912
30	35.4831	30	34.6639
40	45.4558	40	44.6366
50	55.4285	50	54.6093
23 52 00	23 48 05.4012	23 57 00	23 53 04.5820
10	15.3739	10	14.5547
20	25.3465	20	24.5274
30	35.3192	30	34.5001
40	45.2919	40	44.4728
50	55.2646	50	54.4455
23 53 00	23 49 05.2373	23 58 00	23 54 04.4182
10	15.2100	10	14.3909
20	25.1827	20	24.3636
30	35.1554	30	34.3363
40	45.1281	40	44.3090
50	55.1008	50	54.2817
23 54 00	23 50 05.0735	23 59 00	23 55 04.2544
10	15.0462	10	14.2271
20	25.0189	20	24.1998
30	34.9916	30	34.1725
40	44.9643	40	44.1452
50	54.9370	50	54.1179

Sol.	Sidereal.			Sol.	Sidereal.		
d.	d.	h.m.	s.	d.	d.	h.m.	s.
1	1	0 03	56.5553	32	32	2 06	09.7712
2	2	0 07	53.1107	33	33	2 10	06.3265
3	3	0 11	49.6660	34	34	2 14	02.8819
4	4	0 15	46.2214	35	35	2 17	59.4372
5	5	0 19	42.7767	36	36	2 21	55.9926
6	6	0 23	39.3321	37	37	2 25	52.5479
7	7	0 27	35.8874	38	38	2 29	49.1033
8	8	0 31	32.4428	39	39	2 33	45.6586
9	9	0 35	28.9981	40	40	2 37	42.2139
10	10	0 39	25.5535	41	41	2 41	38.7693
11	11	0 43	22.1088	42	42	2 45	35.3246
12	12	0 47	18.6642	43	43	2 49	31.8800
13	13	0 51	15.2195	44	44	2 53	28.4353
14	14	0 55	11.7749	45	45	2 57	24.9907
15	15	0 59	08.3302	46	46	3 01	21.5460
16	16	1 03	04.8856	47	47	3 05	18.1014
17	17	1 07	01.4409	48	48	3 09	14.6567
18	18	1 10	57.9963	49	49	3 13	11.2121
19	19	1 14	54.5516	50	50	3 17	07.7674
20	20	1 18	51.1070	51	51	3 21	04.3228
21	21	1 22	47.6623	52	52	3 25	00.8781
22	22	1 26	44.2177	53	53	3 28	57.4335
23	23	1 30	40.7730	54	54	3 32	53.9888
24	24	1 34	37.3284	55	55	3 36	50.5442
25	25	1 38	33.8837	56	56	3 40	47.0995
26	26	1 42	30.4391	57	57	3 44	43.6549
27	27	1 46	26.9944	58	58	3 48	40.2102
28	28	1 50	23.5498	59	59	3 52	36.7656
29	29	1 54	20.1051	60	60	3 56	33.3209
30	30	1 58	16.6605	61	61	4 00	29.8763
31	31	2 02	13.2158	62	62	4 04	26.4316

Sidereal.	Sol.	Sidereal.	Sol.
d. d. h. m.	s.	d. d. h. m.	s.
1	0 23 56 04.0905	32	31 21 54 10.8976
2	1 23 52 08.1811	33	32 21 50 14.9881
3	2 23 48 12.2716	34	33 21 46 19.0787
4	3 23 44 16.3622	35	34 21 42 23.1692
5	4 23 40 20.4527	36	35 21 38 27.2598
6	5 23 36 24.5433	37	36 21 34 31.3503
7	6 23 32 28.6338	38	37 21 30 35.4409
8	7 23 28 32.7244	39	38 21 26 39.5314
9	8 23 24 36.8149	40	39 21 22 43.6220
10	9 23 20 40.9055	41	40 21 18 47.7125
11	10 23 16 44.9960	42	41 21 14 51.8031
12	11 23 12 49.0866	43	42 21 10 55.8936
13	12 23 08 53.1771	44	43 21 06 59.9842
14	13 23 04 57.2677	45	44 21 03 04.0747
15	14 23 01 01.3582	46	45 20 59 08.1653
16	15 22 57 05.4488	47	46 20 55 12.2558
17	16 22 53 09.5393	48	47 20 51 16.3464
18	17 22 49 13.6299	49	48 20 47 20.4369
19	18 22 45 17.7204	50	49 20 43 24.5275
20	19 22 41 21.8110	51	50 20 39 28.6180
21	20 22 37 25.9015	52	51 20 35 32.7086
22	21 22 33 29.9921	53	52 20 31 36.7991
23	22 22 29 34.0826	54	53 20 27 40.8897
24	23 22 25 38.1732	55	54 20 23 44.9802
25	24 22 21 42.2637	56	55 20 19 49.0708
26	25 22 17 46.3543	57	56 20 15 53.1613
27	26 22 13 50.4448	58	57 20 11 57.2519
28	27 22 09 54.5354	59	58 20 08 01.3424
29	28 22 05 58.6259	60	59 20 04 05.4330
30	29 22 02 02.7165	61	60 20 00 09.5235
31	30 21 58 06.8070	62	61 19 56 13.6141

Sol.	Sidereal.	Sol.	Sidereal.
d. d. h.m. s.	d. d. h.m. s.	d. d. h.m. s.	d. d. h.m. s.
63	63 4 08 22.9870	94	94 6 10 36.2028
64	64 4 12 19.5423	95	95 6 14 32.7581
65	65 4 16 16.0977	96	96 6 18 29.3135
66	66 4 20 12.6530	97	97 6 22 25.8688
67	67 4 24 09.2084	98	98 6 26 22.4242
68	68 4 28 05.7637	99	99 6 30 18.9795
69	69 4 32 02.3191	100	100 6 34 15.5349
70	70 4 35 58.8744	101	101 6 38 12.0902
71	71 4 39 55.4298	102	102 6 42 08.6456
72	72 4 43 51.9851	103	103 6 46 05.2009
73	73 4 47 48.5405	104	104 6 50 01.7563
74	74 4 51 45.0958	105	105 6 53 58.3116
75	75 4 55 41.6512	106	106 6 57 54.8670
76	76 4 59 38.2065	107	107 7 01 51.4223
77	77 5 03 34.7618	108	108 7 05 47.9777
78	78 5 07 31.3172	109	109 7 09 44.5330
79	79 5 11 27.8725	110	110 7 13 41.0884
80	80 5 15 24.4279	111	111 7 17 37.6437
81	81 5 19 20.9832	112	112 7 21 34.1991
82	82 5 23 17.5386	113	113 7 25 30.7544
83	83 5 27 14.0939	114	114 7 29 27.3098
84	84 5 31 10.6493	115	115 7 33 23.8651
85	85 5 35 07.2046	116	116 7 37 20.4204
86	86 5 39 03.7600	117	117 7 41 16.9758
87	87 5 43 00.3153	118	118 7 45 13.5311
88	88 5 46 56.8707	119	119 7 49 10.0865
89	89 5 50 53.4260	120	120 7 53 06.6418
90	90 5 54 49.9814	121	121 7 57 03.1972
91	91 5 58 46.5367	122	122 8 00 59.7525
92	92 6 02 43.0921	123	123 8 04 56.3079
93	93 6 06 39.6474	124	124 8 08 52.8632



Sidereal.	Sol.	Sidereal.	Sol.
d. d. h. m. s.		d. d. h. m. s.	
63	62 19 52 17.7046	94	93 17 50 24.5117
64	63 19 48 21.7952	95	94 17 46 28.6022
65	64 19 44 25.8857	96	95 17 42 32.6928
66	65 19 40 29.9763	97	96 17 38 36.7833
67	66 19 36 34.0668	98	97 17 34 40.8739
68	67 19 32 38.1574	99	98 17 30 44.9644
69	68 19 28 42.2479	100	99 17 26 49.0550
70	69 19 24 46.3385	101	100 17 22 53.1455
71	70 19 20 50.4290	102	101 17 18 57.2361
72	71 19 16 54.5196	103	102 17 15 01.3266
73	72 19 12 58.6101	104	103 17 11 05.4172
74	73 19 09 02.7007	105	104 17 07 09.5077
75	74 19 05 06.7912	106	105 17 03 13.5983
76	75 19 01 10.8818	107	106 16 59 17.6888
77	76 18 57 14.9723	108	107 16 55 21.7794
78	77 18 53 19.0629	109	108 16 51 25.8699
79	78 18 49 23.1534	110	109 16 47 29.9605
80	79 18 45 27.2440	111	110 16 43 34.0510
81	80 18 41 31.3345	112	111 16 39 38.1416
82	81 18 37 35.4251	113	112 16 35 42.2321
83	82 18 33 39.5156	114	113 16 31 46.3227
84	83 18 29 43.6062	115	114 16 27 50.4132
85	84 18 25 47.6967	116	115 16 23 54.5038
86	85 18 21 51.7873	117	116 16 19 58.5943
87	86 18 17 55.8778	118	117 16 16 02.6849
88	87 18 13 59.9684	119	118 16 12 06.7754
89	88 18 10 04.0589	120	119 16 08 10.8660
90	89 18 06 08.1495	121	120 16 04 14.9565
91	90 18 02 12.2400	122	121 16 00 19.0471
92	91 17 58 16.3306	123	122 15 56 23.1376
93	92 17 54 20.4211	124	123 15 52 27.2282

Sol.	Sidereal.			Sol.	Sidereal.		
d.	d.	h. m.	s.	d.	d.	h. m.	s.
125	125	8 12	49.4186	156	156 10 15	02.6344	
126	126	8 16	45.9739	157	157 10 18	59.1897	
127	127	8 20	42.5293	158	158 10 22	55.7451	
128	128	8 24	39.0846	159	159 10 26	52.3004	
129	129	8 28	35.6400	160	160 10 30	48.8558	
130	130	8 32	32.1953	161	161 10 34	45.4111	
131	131	8 36	28.7507	162	162 10 38	41.9665	
132	132	8 40	25.3060	163	163 10 42	38.5218	
133	133	8 44	21.8614	164	164 10 46	35.0772	
134	134	8 48	18.4167	165	165 10 50	31.6325	
135	135	8 52	14.9721	166	166 10 54	28.1879	
136	136	8 56	11.5274	167	167 10 58	24.7432	
137	137	9 00	08.0828	168	168 11 02	21.2986	
138	138	9 04	04.6381	169	169 11 06	17.8539	
139	139	9 08	01.1935	170	170 11 10	14.4093	
140	140	9 11	57.7488	171	171 11 14	10.9646	
141	141	9 15	54.3042	172	172 11 18	07.5200	
142	142	9 19	50.8595	173	173 11 22	04.0753	
143	143	9 23	47.4149	174	174 11 26	00.6307	
144	144	9 27	43.9702	175	175 11 29	57.1860	
145	145	9 31	40.5256	176	176 11 33	53.7414	
146	146	9 35	37.0809	177	177 11 37	50.2967	
147	147	9 39	33.6363	178	178 11 41	46.8521	
148	148	9 43	30.1916	179	179 11 45	43.4074	
149	149	9 47	26.7470	180	180 11 49	39.9628	
150	150	9 51	23.3023	181	181 11 53	36.5181	
151	151	9 55	19.8577	182	182 11 57	33.0735	
152	152	9 59	16.4130	183	183 12 01	29.6288	
153	153	10 03	12.9684	184	184 12 05	26.1842	
154	154	10 07	09.5237	185	185 12 09	22.7395	
155	155	10 11	06.0790	186	186 12 13	19.2949	

Sidereal.	Sol.			Sidereal.	Sol.		
d.	d.	h. m.	s.	d.	d.	h. m.	s.
125	124	15 48	31.3187	156	155	13 46	38.1258
126	125	15 44	35.4093	157	156	13 42	42.2163
127	126	15 40	39.4998	158	157	13 38	46.3069
128	127	15 36	43.5904	159	158	13 34	50.3974
129	128	15 32	47.6809	160	159	13 30	54.4880
130	129	15 28	51.7715	161	160	13 26	58.5785
131	130	15 24	55.8620	162	161	13 23	02.6691
132	131	15 20	59.9526	163	162	13 19	06.7596
133	132	15 17	04.0431	164	163	13 15	10.8502
134	133	15 13	08.1337	165	164	13 11	14.9407
135	134	15 09	12.2242	166	165	13 07	19.0313
136	135	15 05	16.3148	167	166	13 03	23.1218
137	136	15 01	20.4053	168	167	12 59	27.2124
138	137	14 57	24.4959	169	168	12 55	31.3029
139	138	14 53	28.5864	170	169	12 51	35.3935
140	139	14 49	32.6770	171	170	12 47	39.4840
141	140	14 45	36.7675	172	171	12 43	43.5746
142	141	14 41	40.8581	173	172	12 39	47.6651
143	142	14 37	44.9486	174	173	12 35	51.7557
144	143	14 33	49.0392	175	174	12 31	55.8462
145	144	14 29	53.1297	176	175	12 27	59.9368
146	145	14 25	57.2203	177	176	12 24	04.0273
147	146	14 22	01.3108	178	177	12 20	08.1179
148	147	14 18	05.4014	179	178	12 16	12.2084
149	148	14 14	09.4919	180	179	12 12	16.2990
150	149	14 10	13.5825	181	180	12 08	20.3895
151	150	14 06	17.6730	182	181	12 04	24.4801
152	151	14 02	21.7636	183	182	12 00	28.5706
153	152	13 58	25.8541	184	183	11 56	32.6612
154	153	13 54	29.9447	185	184	11 52	36.7517
155	154	13 50	34.0352	186	185	11 48	40.8423

Sol.	Sidereal.			Sol.	Sidereal.		
d.	d.	h. m.	s.	d.	d.	h. m.	s.
187	187	12 17	15.8502	218	218	14 19	29.0660
188	188	12 21	12.4056	219	219	14 23	25.6214
189	189	12 25	08.9609	220	220	14 27	22.1767
190	190	12 29	05.5163	221	221	14 31	18.7321
191	191	12 33	02.0716	222	222	14 35	15.2874
192	192	12 36	58.6269	223	223	14 39	11.8428
193	193	12 40	55.1823	224	224	14 43	08.3981
194	194	12 44	51.7376	225	225	14 47	04.9535
195	195	12 48	48.2930	226	226	14 51	01.5088
196	196	12 52	44.8483	227	227	14 54	58.0642
197	197	12 56	41.4037	228	228	14 58	54.6195
198	198	13 00	37.9590	229	229	15 02	51.1749
199	199	13 04	34.5144	230	230	15 06	47.7302
200	200	13 08	31.0697	231	231	15 10	44.2855
201	201	13 12	27.6251	232	232	15 14	40.8409
202	202	13 16	24.1804	233	233	15 18	37.3962
203	203	13 20	20.7358	234	234	15 22	33.9516
204	204	13 24	17.2911	235	235	15 26	30.5069
205	205	13 28	13.8465	236	236	15 30	27.0623
206	206	13 32	10.4018	237	237	15 34	23.6176
207	207	13 36	06.9572	238	238	15 38	20.1730
208	208	13 40	03.5125	239	239	15 42	16.7283
209	209	13 44	00.0679	240	240	15 46	13.2837
210	210	13 47	56.6232	241	241	15 50	09.8390
211	211	13 51	53.1786	242	242	15 54	06.3944
212	212	13 55	49.7339	243	243	15 58	02.9497
213	213	13 59	46.2893	244	244	16 01	59.5051
214	214	14 03	42.8446	245	245	16 05	56.0604
215	215	14 07	39.4000	246	246	16 09	52.6158
216	216	14 11	35.9553	247	247	16 13	49.1711
217	217	14 15	32.5107	248	248	16 17	45.7265

Sidereal.				Sol.				Sidereal.				Sol.			
d.	d.	h.	m.	s.				d.	d.	h.	m.	s.			
187	186	11	44	44.9328				218	217	9	42	51.7399			
188	187	11	40	49.0234				219	218	9	38	55.8304			
189	188	11	36	53.1139				220	219	9	34	59.9210			
190	189	11	32	57.2045				221	220	9	31	04.0115			
191	190	11	29	01.2950				222	221	9	27	08.1021			
192	191	11	25	05.3856				223	222	9	23	12.1926			
193	192	11	21	09.4761				224	223	9	19	16.2832			
194	193	11	17	13.5667				225	224	9	15	20.3737			
195	194	11	13	17.6572				226	225	9	11	24.4643			
196	195	11	09	21.7478				227	226	9	07	28.5548			
197	196	11	05	25.8383				228	227	9	03	32.6454			
198	197	11	01	29.9289				229	228	8	59	36.7359			
199	198	10	57	34.0194				230	229	8	55	40.8265			
200	199	10	53	38.1100				231	230	8	51	44.9170			
201	200	10	49	42.2005				232	231	8	47	49.0076			
202	201	10	45	46.2911				233	232	8	43	53.0981			
203	202	10	41	50.3816				234	233	8	39	57.1887			
204	203	10	37	54.4722				235	234	8	36	01.2792			
205	204	10	33	58.5627				236	235	8	32	05.3698			
206	205	10	30	02.6533				237	236	8	28	09.4603			
207	206	10	26	06.7438				238	237	8	24	13.5509			
208	207	10	22	10.8344				239	238	8	20	17.6414			
209	208	10	18	14.9249				240	239	8	16	21.7320			
210	209	10	14	19.0155				241	240	8	12	25.8225			
211	210	10	10	23.1060				242	241	8	08	29.9131			
212	211	10	06	27.1966				243	242	8	04	34.0036			
213	212	10	02	31.2871				244	243	8	00	38.0942			
214	213	9	58	35.3777				245	244	7	56	42.1847			
215	214	9	54	39.4682				246	245	7	52	46.2753			
216	215	9	50	43.5588				247	246	7	48	50.3658			
217	216	9	46	47.6493				248	247	7	44	54.4564			

Sol.	Sidereal.			Sol.	Sidereal.		
d.	d.	h. m.	s.	d.	d.	h. m.	s.
249	249	16 21	42.2818	280	280	18 23	55.4976
250	250	16 25	38.8372	281	281	18 27	52.0530
251	251	16 29	35.3925	282	282	18 31	48.6083
252	252	16 33	31.9479	283	283	18 35	45.1637
253	253	16 37	28.5032	284	284	18 39	41.7190
254	254	16 41	25.0586	285	285	18 43	38.2744
255	255	16 45	21.6139	286	286	18 47	34.8297
256	256	16 49	18.1693	287	287	18 51	31.3851
257	257	16 53	14.7246	288	288	18 55	27.9404
258	258	16 57	11.2800	289	289	18 59	24.4958
259	259	17 01	07.8353	290	290	19 03	21.0511
260	260	17 05	04.3907	291	291	19 07	17.6065
261	261	17 09	00.9460	292	292	19 11	14.1618
262	262	17 12	57.5014	293	293	19 15	10.7172
263	263	17 16	54.0567	294	294	19 19	07.2725
264	264	17 20	50.6121	295	295	19 23	03.8279
265	265	17 24	47.1674	296	296	19 27	00.3832
266	266	17 28	43.7228	297	297	19 30	56.9386
267	267	17 32	40.2781	298	298	19 34	53.4939
268	268	17 36	36.8334	299	299	19 38	50.0493
269	269	17 40	33.3888	300	300	19 42	46.6046
270	270	17 44	29.9441	301	301	19 46	43.1600
271	271	17 48	26.4995	302	302	19 50	39.7153
272	272	17 52	23.0548	303	303	19 54	36.2707
273	273	17 56	19.6102	304	304	19 58	32.8260
274	274	18 00	16.1655	305	305	20 02	29.3814
275	275	18 04	12.7209	306	306	20 06	25.9367
276	276	18 08	09.2762	307	307	20 10	22.4920
277	277	18 12	05.8316	308	308	20 14	19.0474
278	278	18 16	02.3869	309	309	20 18	15.6027
279	279	18 19	58.9423	310	310	20 22	12.1581

Sidereal.	Sol.			Sidereal.	Sol.		
d.	d.	h.m.	s.	d.	d.	h.m.	s.
249	248	7 40	58.5469	280	279	5 39	05.3540
250	249	7 37	02.6375	281	280	5 35	09.4445
251	250	7 33	06.7280	282	281	5 31	13.5351
252	251	7 29	10.8186	283	282	5 27	17.6256
253	252	7 25	14.9091	284	283	5 23	21.7162
254	253	7 21	18.9997	285	284	5 19	25.8067
255	254	7 17	23.0902	286	285	5 15	29.8973
256	255	7 13	27.1808	287	286	5 11	33.9878
257	256	7 09	31.2713	288	287	5 07	38.0784
258	257	7 05	35.3619	289	288	5 03	42.1689
259	258	7 01	39.4524	290	289	4 59	46.2595
260	259	6 57	43.5430	291	290	4 55	50.3500
261	260	6 53	47.6335	292	291	4 51	54.4406
262	261	6 49	51.7241	293	292	4 47	58.5311
263	262	6 45	55.8146	294	293	4 44	02.6217
264	263	6 41	59.9052	295	294	4 40	06.7122
265	264	6 38	03.9957	296	295	4 36	10.8028
266	265	6 34	08.0863	297	296	4 32	14.8933
267	266	6 30	12.1768	298	297	4 28	18.9839
268	267	6 26	16.2674	299	298	4 24	23.0744
269	268	6 22	20.3579	300	299	4 20	27.1650
270	269	6 18	24.4485	301	300	4 16	31.2555
271	270	6 14	28.5390	302	301	4 12	35.3461
272	271	6 10	32.6296	303	302	4 08	39.4366
273	272	6 06	36.7201	304	303	4 04	43.5272
274	273	6 02	40.8107	305	304	4 00	47.6177
275	274	5 58	44.9012	306	305	3 56	51.7083
276	275	5 54	48.9918	307	306	3 52	55.7988
277	276	5 50	53.0823	308	307	3 48	59.8894
278	277	5 46	57.1729	309	308	3 45	03.9799
279	278	5 43	01.2634	310	309	3 41	08.0705

Sol.	Sidereal.			Sol.	Sidereal.		
d.	d.	h. m.	s.	d.	d.	h. m.	s.
311	311	20 26	08.7134	339	339	22 16	32.2632
312	312	20 30	05.2688	340	340	22 20	28.8186
313	313	20 34	01.8241	341	341	22 24	25.3739
314	314	20 37	58.3795	342	342	22 28	21.9293
315	315	20 41	54.9348	343	343	22 32	18.4846
316	316	20 45	51.4902	344	344	22 36	15.0400
317	317	20 49	48.0455	345	345	22 40	11.5953
318	318	20 53	44.6009	346	346	22 44	08.1506
319	319	20 57	41.1562	347	347	22 48	04.7060
320	320	21 01	37.7116	348	348	22 52	01.2613
321	321	21 05	34.2669	349	349	22 55	57.8167
322	322	21 09	30.8223	350	350	22 59	54.3720
323	323	21 13	27.3776	351	351	23 03	50.9274
324	324	21 17	23.9330	352	352	23 07	47.4827
325	325	21 21	20.4883	353	353	23 11	44.0381
326	326	21 25	17.0437	354	354	23 15	40.5934
327	327	21 29	13.5990	355	355	23 19	37.1488
328	328	21 33	10.1544	356	356	23 23	33.7041
329	329	21 37	06.7097	357	357	23 27	30.2595
330	330	21 41	03.2651	358	358	23 31	26.8148
331	331	21 44	59.8204	359	359	23 35	23.3702
332	332	21 48	56.3758	360	360	23 39	19.9255
333	333	21 52	52.9311	361	361	23 43	16.4809
334	334	21 56	49.4865	362	362	23 47	13.0362
335	335	22 00	46.0418	363	363	23 51	09.5916
336	336	22 04	42.5972	364	364	23 55	06.1469
337	337	22 08	39.1525	365	365	23 59	02.7023
338	338	22 12	35.7079	366	367	0 02	59.2576

1461 1465 0 00 07.3644



Sidereal.	Sol.			Sidereal.	Sol.		
d.	d.	h.m.	s.	d.	d.	h.m.	s.
311	310	3 37	12.1610	339	338	1 47	06.6964
312	311	3 33	16.2516	340	339	1 43	10.7870
313	312	3 29	20.3421	341	340	1 39	14.8775
314	313	3 25	24.4327	342	341	1 35	18.9681
315	314	3 21	28.5232	343	342	1 31	23.0586
316	315	3 17	32.6138	344	343	1 27	27.1492
317	316	3 13	36.7043	345	344	1 23	31.2397
318	317	3 09	40.7949	346	345	1 19	35.3303
319	318	3 05	44.8854	347	346	1 15	39.4208
320	319	3 01	48.9760	348	347	1 11	43.5114
321	320	2 57	53.0665	349	348	1 07	47.6019
322	321	2 53	57.1571	350	349	1 03	51.6925
323	322	2 50	01.2476	351	350	0 59	55.7830
324	323	2 46	05.3382	352	351	0 55	59.8736
325	324	2 42	09.4287	353	352	0 52	03.9641
326	325	2 38	13.5193	354	353	0 48	08.0547
327	326	2 34	17.6098	355	354	0 44	12.1452
328	327	2 30	21.7004	356	355	0 40	16.2358
329	328	2 26	25.7909	357	356	0 36	20.3263
330	329	2 22	29.8815	358	357	0 32	24.4169
331	330	2 18	33.9720	359	358	0 28	28.5074
332	331	2 14	38.0626	360	359	0 24	32.5980
333	332	2 10	42.1531	361	360	0 20	36.6885
334	333	2 06	46.2437	362	361	0 16	40.7791
335	334	2 02	50.3342	363	362	0 12	44.8696
336	335	1 58	54.4248	364	363	0 08	48.9602
337	336	1 54	58.5153	365	364	0 04	53.0507
338	337	1 51	02.6059	366	365	0 00	57.1413

1465 1460 23 59 52.6557



TABLE  
OF THE  
COINCIDENCES  
OF THE  
SOLAR AND SIDEREAL  
CLOCKS  
DURING ONE DAY

Solar.	Sidereal.	Solar.	Sidereal.
0 00 00.00	0 00 00.00	3 02 37.27	3 03 07.27
06 05.24	06 06.24	08 42.51	09 13.51
12 10.48	12 12.48	14 47.75	15 19.75
18 15.73	18 18.73	20 52.99	21 25.99
24 20.97	24 24.97	26 58.24	27 32.24
30 26.21	30 31.21	33 03.48	33 38.48
36 31.45	36 37.45	39 08.72	39 44.72
42 36.70	42 43.70	45 13.96	45 50.96
48 41.94	48 49.94	51 19.20	51 57.20
54 47.18	54 56.18	57 24.45	58 03.45
1 00 52.42	1 01 02.42	4 03 29.69	4 04 09.69
06 57.66	07 08.66	09 34.93	10 15.93
13 02.91	13 14.91	15 40.17	16 22.17
19 08.15	19 21.15	21 45.42	22 28.42
25 13.39	25 27.39	27 50.66	28 34.66
31 18.63	31 33.63	33 55.90	34 40.90
37 23.88	37 39.88	40 01.14	40 47.14
43 29.12	43 46.12	46 06.38	46 53.38
49 34.36	49 52.36	52 11.63	52 59.63
55 39.60	55 58.60	58 16.87	59 05.87
2 01 44.84	2 02 04.84	5 04 22.11	5 05 12.11
07 50.09	08 11.09	10 27.35	11 18.35
13 55.33	14 17.33	16 32.60	17 24.60
20 00.57	20 23.57	22 37.84	23 30.84
26 05.81	26 29.81	28 43.08	29 37.08
32 11.06	32 36.06	34 48.32	35 43.32
38 16.30	38 42.30	40 53.56	41 49.56
44 21.54	44 48.54	46 58.81	47 55.81
50 26.78	50 54.78	53 04.05	54 02.05
56 32.02	57 01.02	59 09.29	6 00 08.29

Solar.	Sidereal.	Solar.	Sidereal.
6 05 14.53	6 06 14.53	9 07 51.80	9 09 21.80
11 19.78	12 20.78	13 57.04	15 28.04
17 25.02	18 27.02	20 02.28	21 34.28
23 30.26	24 33.26	26 07.53	27 40.53
29 35.50	30 39.50	32 12.77	33 46.77
35 40.74	36 45.74	38 18.01	39 53.01
41 45.99	42 51.99	44 23.25	45 59.25
47 51.23	48 58.23	50 28.50	52 05.50
53 56.47	55 04.47	56 33.74	58 11.74
7 00 01.71	7 01 10.71	10 02 38.98	10 04 17.98
06 06.96	07 16.96	08 44.22	10 24.22
12 12.20	13 23.20	14 49.46	16 30.46
18 17.44	19 29.44	20 54.71	22 36.71
24 22.68	25 35.68	26 59.95	28 42.95
30 27.92	31 41.92	33 05.19	34 49.19
36 33.17	37 48.17	39 10.43	40 55.43
42 38.41	43 54.41	45 15.68	47 01.68
48 43.65	50 00.65	51 20.92	53 07.92
54 48.89	56 06.89	57 26.16	59 14.16
8 00 54.14	8 02 13.14	11 03 31.40	11 05 20.40
06 59.38	08 19.38	09 36.64	11 26.64
13 04.62	14 25.62	15 41.89	17 32.89
19 09.86	20 31.86	21 47.13	23 39.13
25 15.10	26 38.10	27 52.37	29 45.37
31 20.35	32 44.35	33 57.61	35 51.61
37 25.59	38 50.59	40 02.85	41 57.85
43 30.83	44 56.83	46 08.10	48 04.10
49 36.07	51 03.07	52 13.34	54 10.34
55 41.32	57 09.32	58 18.58	12 00 16.58
9 01 46.56	9 03 15.56	12 04 23.82	06 22.82

Solar.	Sidereal.	Solar.	Sidereal.
12 10 29.07	12 12 29.07	15 13 06.33	15 15 36.33
16 34.31	18 35.31	19 11.57	21 42.57
22 39.55	24 41.55	25 16.82	27 48.82
28 44.79	30 47.79	31 22.06	33 55.06
34 50.03	36 54.03	37 27.30	40 01.30
40 55.28	43 00.28	43 32.54	46 07.54
47 00.52	49 06.52	49 37.79	52 13.79
53 05.76	55 12.76	55 43.03	58 20.03
59 11.00	13 01 19.00	16 01 48.27	16 04 26.27
13 05 16.25	07 25.25	07 53.51	10 32.51
11 21.49	13 31.49	13 58.75	16 38.75
17 26.73	19 37.73	20 03.100	22 44.100
23 31.97	25 43.97	26 09.24	28 51.24
29 37.21	31 50.21	32 14.48	34 57.48
35 42.46	37 56.46	38 19.72	41 03.72
41 47.70	44 02.70	44 24.97	47 09.97
47 52.94	50 08.94	50 30.21	53 16.21
53 58.18	56 15.18	56 35.45	59 22.45
14 00 03.43	14 02 21.43	17 02 40.69	17 05 28.69
06 08.67	08 27.67	08 45.93	11 34.93
12 13.91	14 33.91	14 51.18	17 41.18
18 19.15	20 40.15	20 56.42	23 47.42
24 24.39	26 46.39	27 01.66	29 53.66
30 29.64	32 52.64	33 06.90	35 59.90
36 34.88	38 58.88	39 12.15	42 06.15
42 40.12	45 05.12	45 17.39	48 12.39
48 45.36	51 11.36	51 22.63	54 18.63
54 50.61	57 17.61	57 27.87	18 00 24.87
15 00 55.85	15 03 23.85	18 03 33.11	06 31.11
07 01.09	09 30.09	09 38.36	12 37.36

Solar.	Sidereal.	Solar.	Sidereal.
18 15 43.60	18 18 43.60	21 18 20.87	21 21 50.87
21 48.84	24 49.84	24 26.11	27 57.11
27 54.08	30 56.08	30 31.35	34 03.35
33 59.33	37 02.33	36 36.59	40 09.59
40 04.57	43 08.57	42 41.83	46 15.83
46 09.81	49 14.81	48 47.08	52 22.08
52 15.05	55 21.05	54 52.32	58 28.32
58 20.29	19 01 27.29	22 00 57.56	22 04 34.56
19 04 25.54	07 33.54	07 02.80	10 40.80
10 30.78	13 39.78	13 08.05	16 47.05
16 36.02	19 46.02	19 13.29	22 53.29
22 41.26	25 52.26	25 18.53	28 59.53
28 46.51	31 58.51	31 23.77	35 05.77
34 51.75	38 04.75	37 29.01	41 12.01
40 56.99	44 10.99	43 34.26	47 18.26
47 02.23	50 17.23	49 39.50	53 24.50
53 07.47	56 23.47	55 44.74	59 30.74
59 12.72	20 02 29.72	23 01 49.98	23 05 36.98
20 05 17.96	08 35.96	07 55.23	11 43.23
11 23.20	14 42.20	14 00.47	17 49.47
17 28.44	20 48.44	20 05.71	23 55.71
23 33.69	26 54.69	26 10.95	30 01.95
29 38.93	33 00.93	32 16.19	36 08.19
35 44.17	39 07.17	38 21.44	42 14.44
41 49.41	45 13.41	44 26.68	48 20.68
47 54.65	51 19.65	50 31.92	54 26.92
53 59.90	57 25.90	56 37.16	24 00 33.16
21 00 05.14	21 03 32.14	24 02 42.41	06 39.41
06 10.38	09 38.38	08 47.65	12 45.65
12 15.62	15 44.62	14 52.89	18 51.89